

HP ProLiant ML310 Server Setup and Installation Guide



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About This Guide

This guide provides step-by-step instructions for installation, and reference information for operation, troubleshooting, and future upgrades for the HP ProLiant ML310 server.

Audience Assumptions

This guide is for the person who installs, administers, and troubleshoots servers. HP assumes you are qualified in the servicing of computer equipment and trained in recognizing hazards in products with hazardous energy levels.

Important Safety Information

Before installing this product, read the *Important Safety Information* document included with the server.

Symbols on Equipment

The following symbols may be placed on equipment to indicate the presence of potentially hazardous conditions:



WARNING: This symbol, in conjunction with any of the following symbols, indicates the presence of a potential hazard. The potential for injury exists if warnings are not observed. Consult your documentation for specific details.



This symbol indicates the presence of hazardous energy circuits or electric shock hazards. Refer all servicing to qualified personnel.

WARNING: To reduce the risk of injury from electric shock hazards, do not open this enclosure. Refer all maintenance, upgrades, and servicing to qualified personnel.



This symbol indicates the presence of electric shock hazards. The area contains no user or field serviceable parts. Do not open for any reason.

WARNING: To reduce the risk of injury from electric shock hazards, do not open this enclosure



This symbol on an RJ-45 receptacle indicates a network interface connection.

WARNING: To reduce the risk of electric shock, fire, or damage to the equipment, do not plug telephone or telecommunications connectors into this receptacle.



This symbol indicates the presence of a hot surface or hot component. If this surface is contacted, the potential for injury exists.

WARNING: To reduce the risk of injury from a hot component, allow the surface to cool before touching.



These symbols, on power supplies or systems, indicate that the equipment is supplied by multiple sources of power.

WARNING: To reduce the risk of injury from electric shock, remove all power cords to completely disconnect power from the system.



Weight in kg
Weight in lb

This symbol indicates that the component exceeds the recommended weight for one individual to handle safely.

WARNING: To reduce the risk of personal injury or damage to the equipment, observe local occupational health and safety requirements and guidelines for manual material handling.

Rack Stability



WARNING: To reduce the risk of personal injury or damage to the equipment, be sure that:

- The leveling jacks are extended to the floor.
 - The full weight of the rack rests on the leveling jacks.
 - The stabilizing feet are attached to the rack if it is a single-rack installation.
 - The racks are coupled together in multiple-rack installations.
 - Only one component is extended at a time. A rack may become unstable if more than one component is extended for any reason.
-

Symbols in Text

These symbols may be found in the text of this guide. They have the following meanings.



WARNING: Text set off in this manner indicates that failure to follow directions in the warning could result in bodily harm or loss of life.



CAUTION: Text set off in this manner indicates that failure to follow directions could result in damage to equipment or loss of information.

IMPORTANT: Text set off in this manner presents essential information to explain a concept or complete a task.

NOTE: Text set off in this manner presents additional information to emphasize or supplement important points of the main text.

Related Documents

For additional information on the topics covered in this guide, refer to the following documentation:

- *HP ProLiant ML310 Server Maintenance and Service Guide*
- *HP ProLiant ML310 Server Cabling Matrix:*
www.compaq.com/products/servers/proliantml310/index.html
- *HP ProLiant ML310 Server Quick Start poster*
- *Servers Troubleshooting Guide:*
www3.compaq.com/support/home/index.asp (Reference Library)

Getting Help

If you have a problem and have exhausted the information in this guide, you can get further information and other help in the following locations.

Technical Support

In North America, call the HP Technical Support Phone Center at 1-800-652-6672. This service is available 24 hours a day, 7 days a week. For continuous quality improvement, calls may be recorded or monitored. Outside North America, call the nearest HP Technical Support Phone Center. Telephone numbers for worldwide Technical Support Centers are listed on the HP website, www.hp.com.

Be sure to have the following information available before you call HP:

- Technical support registration number (if applicable)
- Product serial number
- Product model name and number
- Applicable error messages
- Add-on boards or hardware

- Third-party hardware or software
- Operating system type and revision level

HP Website

The HP website has information on this product as well as the latest drivers and flash ROM images. You can access the HP website at www.hp.com.

Authorized Reseller

For the name of your nearest authorized reseller:

- In the United States, call 1-800-345-1518.
- In Canada, call 1-800-263-5868.
- Elsewhere, see the HP website for locations and telephone numbers.

Reader's Comments

HP welcomes your comments on this guide. Please send your comments and suggestions by e-mail to ServerDocumentation@hp.com.

Server Features

The HP ProLiant ML310 server provides the performance, reliability, and ease of ownership you need to allow your business to grow. With support for one Intel Pentium 4 processor (512 K Advanced Transfer Cache), up to four GB of DDR SDRAM, and four 64-bit PCI slots, the ProLiant ML310 delivers the performance of Pentium 4 in a true server. With the extensive testing that only HP conducts on its servers and with features like Integrated ATA RAID and a Pre-Failure Warranty on processors, memory, and hard drives, the ProLiant ML310 is the server your business can depend on. And thanks to tools like SmartStart software and the Insight Manager management tool, the server is easy to set up and easy to maintain.

Enjoy your new ProLiant server!

Server features include the following:

- Intel Pentium 4 processor
- ECC Registered PC2100 DDR SDRAM DIMM, upgradable to 4 GB
- Capacity for:
 - Five 36.4-GB non-hot-plug SCSI hard drives for a maximum of 182 GB of internal storage
 - Four 80-GB ATA hard drives for a maximum of 320 GB of internal storage
 - Three 36.4-GB non-hot-plug SCSI hard drives and two 72.8-GB hot-plug hard drives in the internal two-bay hot-plug SCSI drive cage option for a maximum of 254 GB of internal storage
- Four removable media bays (three available)
- IDE CD-ROM drive
- 3.5-inch diskette drive
- Four 33-MHz 64-bit PCI slots
- Integrated single-channel Wide Ultra3 SCSI controller or an integrated dual-channel ATA/100 RAID controller
- NC7760 Gigabit Server network interface controller (NIC)
- Integrated ATI Rage XL video controller
- CE Mark-compliant PFC 300W power supply
- Support for HP, Compaq branded, and most third-party racks, with the optional rack-enabling kit
- Support for telco racks, with the optional rack-enabling kit and optional telco rail kit

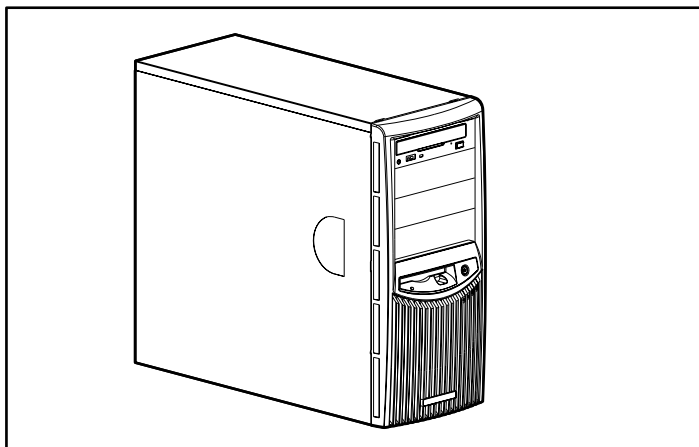


Figure 1-1: ProLiant ML310 server

Standard Hardware Features

The following hardware features are standard on the server, unless otherwise noted.

Drive Bay Configuration

The ProLiant ML310 server supports up to seven internal drive bays. Figure 1-2 and Table 1-1 show the drive bay configuration.

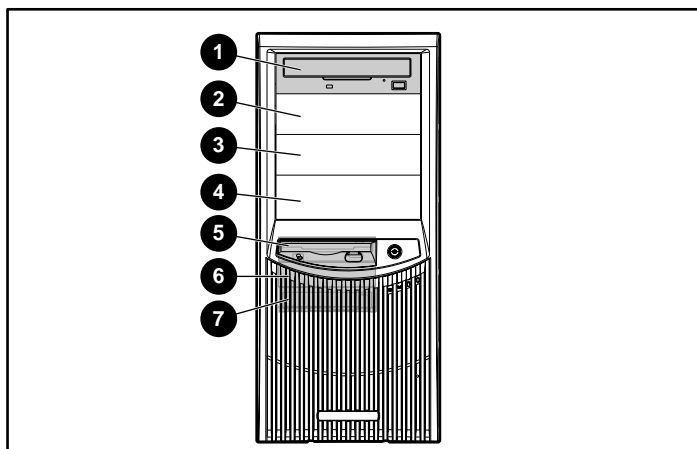


Figure 1-2: Drive bay configuration

Table 1-1: Drive Bay Dimensions

Item	Component	Location	Dimension
1	IDE CD-ROM drive	Media bay 1	13.34 x 4.06 cm 5.25 x 1.60 in
2	Available removable media bay	Media bay 2	13.34 x 4.06 cm 5.25 x 1.60 in
3	Available removable media bay	Media bay 3	13.34 x 4.06 cm 5.25 x 1.60 in
4	Available removable media bay	Media bay 4	13.34 x 4.06 cm 5.25 x 1.60 in
5	Diskette drive	Hard drive bay 1	8.9 x 2.54 cm 3.5 x 1.0 in
6	Hard drive bay	Hard drive bay 2	8.9 x 2.54 cm 3.5 x 1.0 in
7	Hard drive bay	Hard drive bay 3	8.9 x 2.54 cm 3.5 x 1.0 in

Front Panel Components

Figure 1-3 and Table 1-2 show the front panel components, including buttons and LEDs.

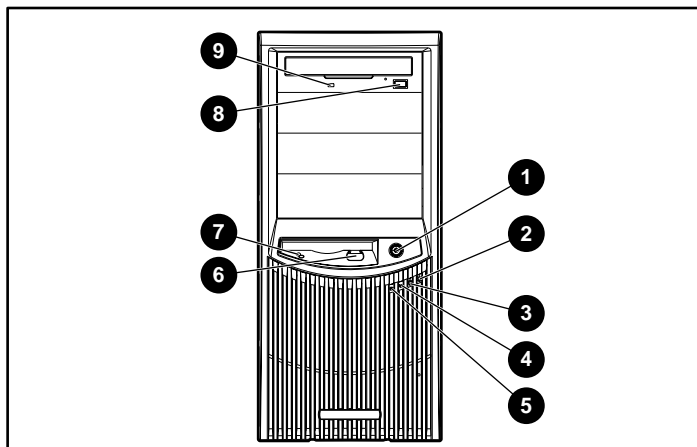


Figure 1-3: Front panel components

Table 1-2: Front Panel Components

Item	Component	Item	Component
1	Power button	6	Diskette drive eject button
2	Power LED	7	Diskette drive activity LED
3	Hard drive activity LED	8	CD-ROM drive eject button
4	NIC link/activity LED	9	CD-ROM drive activity LED
5	Internal health LED		

Rear Panel Connectors

Figure 1-4 and Table 1-3 show the rear panel connectors.

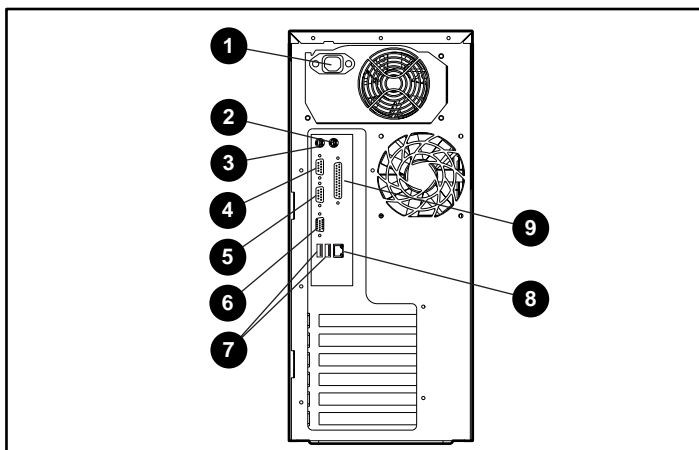


Figure 1-4: Rear panel connectors

Table 1-3: Rear Panel Connectors

Item	Connector	Item	Connector
1	Power cord	6	Video
2	Mouse	7	USB ports (2)
3	Keyboard	8	RJ-45 Ethernet
4	Serial port connector B	9	Parallel port
5	Serial port connector A		

Network Interface Controller Connector LEDs

Figure 1-5 and Table 1-4 show the network interface controller (NIC) connector LEDs.

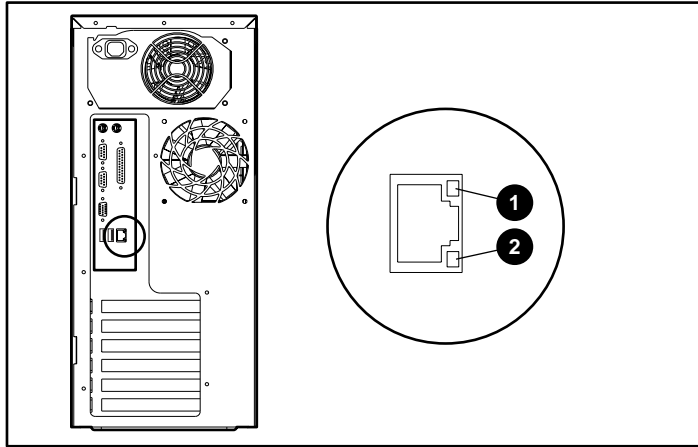


Figure 1-5: NIC connector

Table 1-4: NIC Connector LEDs

Item	LED
1	Network activity
2	Network link

System Board Components

SCSI System Board

Figure 1-6 and Table 1-5 show the components and connectors of the SCSI system board.

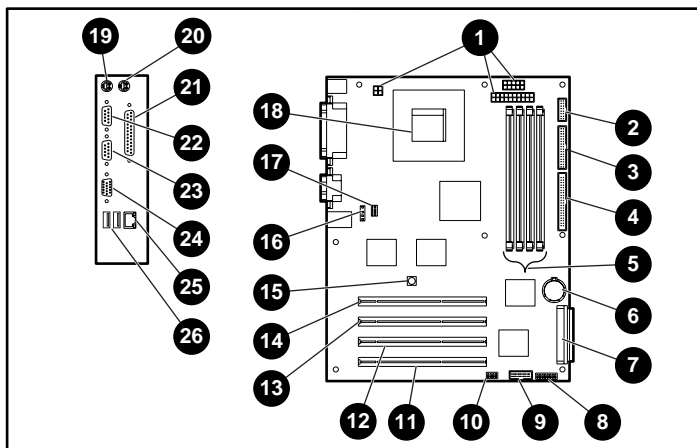


Figure 1-6: SCSI system board components

Table 1-5: SCSI System Board Components

Item	Component	Item	Component
1	Power supply connectors	14	64-bit PCI expansion slot 1
2	Power switch assembly connector	15	NMI switch
3	Diskette drive connector	16	System fan connector
4	IDE connector (ATAPI devices)	17	CPU fan connector
5	DIMM slots	18	Processor socket
6	CR2032 battery	19	Keyboard connector
7	SCSI connector	20	Mouse connector
8	System configuration switch	21	Parallel port connector
9	RIB 30-pin header	22	Serial port connector B
10	System ID switch	23	Serial port connector A
11	64-bit PCI expansion slot 4	24	Video connector
12	64-bit PCI expansion slot 3	25	RJ-45 Ethernet connector
13	64-bit PCI expansion slot 2	26	USB port connectors (2)
Note: For information on system board LEDs and system configuration switch settings, refer to Appendix E, "LED Indicators, Switches, and Jumpers."			

ATA System Board

Figure 1-7 and Table 1-6 show the components and connectors of the ATA system board.

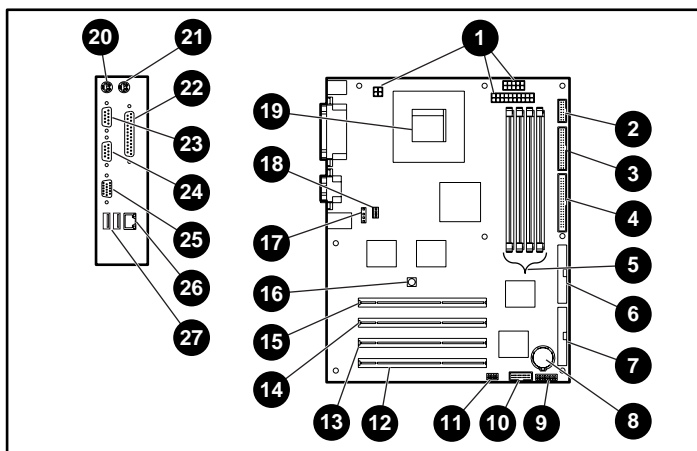


Figure 1-7: ATA system board components

Table 1-6: ATA System Board Components

Item	Component	Item	Component
1	Power supply connectors	15	64-bit PCI expansion slot 1
2	Power switch assembly connector	16	NMI switch
3	Diskette drive connector	17	System fan connector
4	IDE connector (ATAPI devices)	18	CPU fan connector
5	DIMM slots	19	Processor socket
6	ATA/100 RAID primary connector	20	Keyboard connector
7	ATA/100 RAID secondary connector	21	Mouse connector
8	CR2032 battery	22	Parallel port connector
9	System configuration switch	23	Serial port connector B
10	RIB 30-pin header	24	Serial port connector A
11	System ID switch	25	Video connector
12	64-bit PCI expansion slot 4	26	RJ-45 Ethernet connector
13	64-bit PCI expansion slot 3	27	USB port connectors (2)
14	64-bit PCI expansion slot 2		

Note: For information on system board LEDs and system configuration switch settings, refer to Appendix E, “LED Indicators, Switches, and Jumpers.”

For information on how to replace the battery, refer to “Replacing the Battery” in Chapter 3.

Processor and Server Memory

- Intel Pentium 4 processor with 512 K Advanced Transfer Cache
- Support for up to four ECC Registered PC2100 DDR SDRAM DIMMs, installed one at a time, in any order, expandable to 4 GB
 - ECC for memory error detection and correction
 - PC2100 memory, which runs at 266 MHz (full speed) with a 533-MHz front side bus, and runs at 200-MHz with a 400-MHz front side bus

Expansion Slots

Four 33-MHz, 64-bit PCI expansion slots

Storage Controller

- Integrated single-channel Wide Ultra3 SCSI controller on the PCI local bus (SCSI model)
- Integrated dual-channel ATA/100 RAID controller (ATA model) with support for integrated ATA RAID 0, 1, and 1+0
- Optional controller boards available for expanding storage capacity or controller duplexing

Network Controller

NC7760 Gigabit Server NIC

Video Controller

- Integrated ATI Rage XL video controller
- Support for SVGA, VGA, and EGA graphics resolution
- 8 MB SDRAM video memory providing maximum resolution of 1600 x 1200 noninterlaced True Color (32-bit)

Ports/Connectors

- Serial (2)
- Parallel
- Keyboard
- Mouse
- USB (2)
- NIC
- Video

Power Supply

CE Mark-compliant 300 W PFC power supply

Warranty

The Pre-Failure Warranty helps prevent unplanned shutdowns of the server by allowing for the replacement of covered parts before they fail. The warranty covers processors, memory, and hard drives. Insight Manager, included with the server, must be installed for the Pre-Failure Warranty to be in effect.

When Insight Manager alerts you that a component may be eligible for Pre-Failure Warranty replacement, follow the onscreen instructions or contact an authorized service provider in your area. A yellow status indicator on the Insight Manager control panel signals that a component is in a pre-failure condition and should be replaced.

Consult the Customer Support Center or refer to the Limited Warranty Statement included with the server for details. Certain restrictions and exclusions apply. For additional warranty information, refer to

www.compaq.com/support/

Server Configuration and Management

The ProLiant ML310 server offers an extensive set of features and optional tools to support effective server management and configuration, which may include the following:

- ROM-Based Setup Utility (RBSU)—performs a wide range of system configuration activities
- ROMPaq utility—upgrades the firmware (BIOS) by flashing the system ROM and provides redundant ROM support in case of ROM corruption
- System Firmware Update—updates system firmware on remote servers from a central location (used in conjunction with the Remote Deployment Utility Console)
- SmartStart software—provides driver updates and assisted operating system installation
- Insight Manager management tool—monitors fault conditions, server performance, security, and more
- Diagnostics utility—tests and verifies the operation of hardware
- Automatic Server Recovery (ASR)—automatically resets a server that has not responded in a select amount of time or has reached a dangerous temperature (if the **thermal shutdown** option is enabled in RBSU)
- Survey Utility—allows you to keep a historical record of server hardware and software changes in a single configuration history file
- Power-On Self-Test—checks firmware and assemblies during server startup to ensure that the server is functioning properly
- Integrated ATA RAID Configuration Utility (ATA model)—supports, configures, and manages ATA hard drive arrays
- Integrated ATA RAID Management Utility (ATA model)—monitors health of ATA hard drive arrays
- Preboot Execution Environment (PXE)—supports the remote installation and configuration of operating systems

Refer to Chapter 5, “Server Configuration and Utilities,” or Chapter 6, “RAID Configuration and Management,” for detailed information on each of these utilities.

Security

Security features for the ProLiant ML310 server include:

- Power-on password
- Administrator password
- Network server mode
- Diskette write control
- QuickLock
- Redundant ROM support

Most security features are established through RBSU. Refer to Chapter 5, “Server Configuration and Utilities,” or the *HP ROM-Based Setup Utility User Guide*, for detailed information on RBSU. For additional information concerning server security features, refer to the SmartStart CD included in the shipping box.

Overview of Server Installation

The following instructions are provided as an overview for first-time installation of the ProLiant ML310 server. If you have any problems, contact the authorized reseller.



WARNING: To reduce the risk of electric shock or damage to the equipment:

- Do not disable the power cord grounding plug. The grounding plug is an important safety feature.
- Plug the power cord into a grounded (earthed) electrical outlet that is easily accessible at all times.
- Disconnect power from the server by unplugging the power cord from either the electrical outlet or the server.
- Do not place anything on power cords or cables. Arrange them so that no one can accidentally step on or trip over them. Do not pull on a cord or cable. When unplugging from the electrical outlet, grasp the cord by the plug.



CAUTION: Electrostatic discharge (ESD) can damage electronic components. Be sure that you are properly grounded (earthed) before beginning any installation procedure. Refer to Appendix B, "Electrostatic Discharge," for more information.

Selecting a Site

Be sure that the installation area you select has the following features:

- A sturdy, level site that includes dedicated and properly grounded (earthed) circuits, air conditioning, and ESD protection
- 7.6-cm (3.0-inch) clearance on all sides of the tower server for proper ventilation

IMPORTANT: Refer to the section, “Installing the Rack Server,” in this chapter for clearance specifications if you are installing the server into a rack.

- A separate electrical circuit for the server



CAUTION: Protect the server from power fluctuations and temporary interruptions with a regulating uninterruptible power supply (UPS). This device protects the hardware from damage caused by power surges and voltage spikes and keeps the server in operation during a power failure.

To purchase a UPS, contact your local authorized reseller or refer to

www.hp.com/products/ups

Refer to Appendix F, “Specifications,” for detailed power and temperature requirements.

Installing the Rack Server

The server offers optional support for HP, Compaq branded, and some third-party rack solutions. This section provides an overview of the rack-enabling option, as well as environmental information required for the installation of a rack-mounted server.

Rack-Enabling Option

Figure 2-1 shows the server installed into a rack.

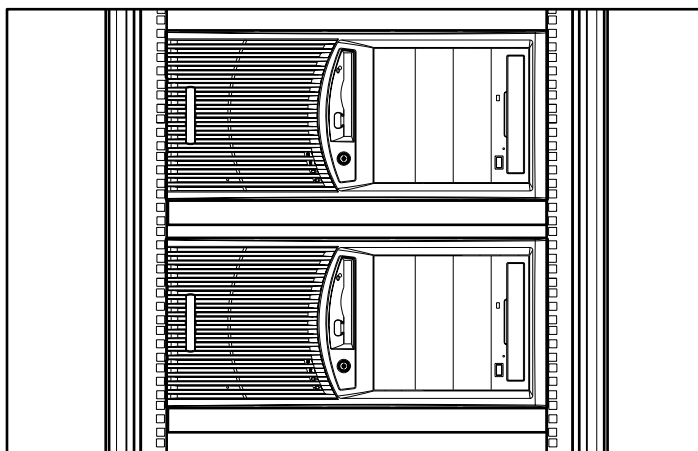


Figure 2-1: ProLiant ML310 server installed into a rack

To purchase the rack-enabling kit (part number 249443-001), contact your local authorized reseller, or visit

www.compaq.com/products/servers/proliantml310/index.html

A selection of racks for the server can be purchased through your authorized reseller or online at

www.hp.com/products/serverstorage

Rack Environment

To allow for servicing and adequate airflow, observe the following spatial requirements when selecting a site for the rack-mounted server:

- A minimum clearance of 63.5 cm (25.0 inches) in front of the rack
- A minimum clearance of 76.2 cm (30.0 inches) behind the rack
- A minimum clearance of 121.9 cm (48.0 inches) from the back of the rack to the back of another rack or row of racks

HP servers draw in cool air through the front door of the rack and expel warm air through the rear door. Therefore, the front door must be adequately ventilated to allow ambient room air to enter the cabinet, and the rear door must be adequately ventilated to allow the warm air to escape from the cabinet.

IMPORTANT: Do not block the ventilation openings.

When there is any vertical space in the rack not filled by a server or rack component, the gaps between the components cause changes in airflow through the rack and across the servers. Cover all gaps with blanking panels to maintain proper airflow.



CAUTION: Always use blanking panels to fill empty vertical spaces in the rack. This arrangement ensures proper airflow. Using a rack without blanking panels results in improper cooling that can lead to thermal damage.



CAUTION: When using a Compaq branded 7000 Series rack, you must install the high-airflow rack door insert [part number 327281-B21 (42U) and part number 157847-B21 (22U)] to provide proper front-to-back airflow and cooling and to prevent damage to the equipment.

Compaq branded 9000 Series racks provide proper server cooling from flow-through perforations, ensuring 64 percent open area for ventilation. Refer to the rack documentation provided with Compaq branded 7000 Series racks for guidelines on meeting airflow requirements.



CAUTION: If an HP or third-party rack is used, observe the following additional requirements to ensure adequate airflow and to prevent damage to the equipment:

- Front and rear doors: If the 42U server rack includes closing front and rear doors, you must allow 5,350 sq cm (830 sq in) of holes evenly distributed from top to bottom to permit adequate airflow (equivalent to the required 64 percent open area for ventilation).
 - Side: The clearance between the installed rack component and the side panels of the rack must be a minimum of 7 cm (2.75 in).
-

For additional information and instructions on installing the server into a rack, refer to the rack-enabling kit documentation.

Locating Materials

Locate the following materials that were shipped with the server:

- Keyboard
- Mouse
- Power cord
- ProLiant Essentials Foundation Pack, which includes the documentation and software

In addition to these supplied items, you may need the following:

- Torx T-10 screwdriver
- Torx T-15 screwdriver
- Phillips #2 screwdriver
- Hardware options
- Uninterruptible power supply (UPS)

- Ethernet cable
- Monitor
- Application software

Installation Sequence

Observe the following cautions before beginning any installation procedures.



CAUTION: If the server has a factory-installed operating system, prevent data loss by configuring the server using the instructions in the section, “Factory-Installed Operating Systems.” If the operating system was not factory-installed, follow the instructions in the “Operating Systems Purchased Separately” section in this chapter.



CAUTION: Before powering up the server, be sure that the power cord and all cables have been properly connected or server data could be lost.

Factory-Installed Operating Systems

If you ordered the server with a factory-installed operating system, everything required to install the operating system is already on the server. Refer to the steps provided in the *HP Factory-Installed Operating System Software User Guide*.

IMPORTANT: Follow these instructions before installing any additional hardware.

To install the server:

1. Review and follow the guidelines in the following sections:
 - Selecting a Site
 - Installing the Rack Server
 - Locating Materials
2. Connect the power cord and any peripheral devices. Refer to Chapter 1, “Server Features,” for the location of all rear panel connectors.



WARNING: To reduce the risk of electric shock or fire, do not plug telecommunications/telephone connectors into the network interface controller (NIC) receptacle.

3. After the cables have been connected, you are ready to power up the server by pressing the power button on the front of the server.

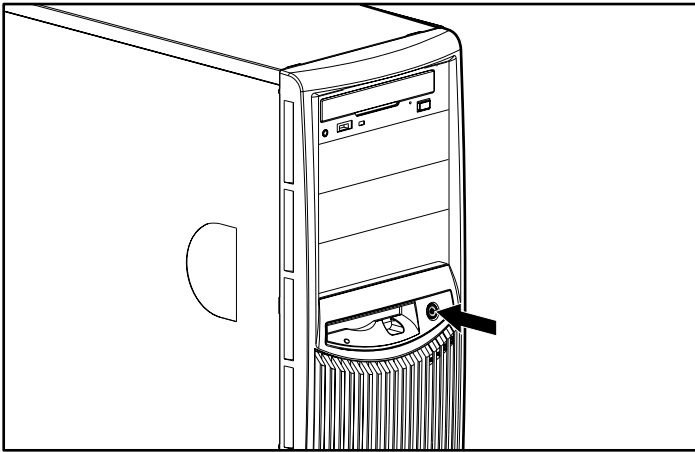


Figure 2-2: Powering up the server

4. Follow the onscreen instructions to complete the factory-installed operating system initialization process. After initialization is complete, the server automatically goes through Power-On Self-Test (POST).

IMPORTANT: To avoid automatic RAID 0 configuration in ATA models, you must configure an array before OS installation. If you change the RAID level, you must re-install the operating system. Refer to Chapter 6 for more information on configuring arrays.

5. To manage the server, install Insight Manager, found on the Management CD. For Management CD initialization procedures, refer to the ProLiant Essentials Foundation Pack shipped with the server.

IMPORTANT: You must install and use Insight Manager to benefit from the Pre-Failure Warranty on processors, hard drives, and memory modules.

6. After verifying the server configuration, back up the system configuration. Refer to the **System Configuration Utility** menu on the SmartStart CD for further information on backing up the system configuration.
7. Install any additional hardware. Refer to Chapter 3, “Hardware Options Installation,” or the option kits, for detailed instructions on installing internal hardware.
8. Install any application software.
9. Register the server at
register.hp.com

Operating Systems Purchased Separately

If you purchased the operating system separately, HP recommends that you install it using the SmartStart CD. Refer to the ProLiant Essentials Foundation Pack for instructions on using SmartStart. The first time the server is configured, the SmartStart program automatically creates a necessary partition on the hard drive. This partition cannot be used for any other purpose and is not a traditional system partition.

When installing the operating system for the first time:

1. Review all guidelines in the following sections:
 - Selecting a Site
 - Installing the Rack Server
 - Locating Materials
2. Install any hardware options. Refer to Chapter 3, “Hardware Options Installation,” or the option kits, for detailed instructions on installing internal hardware.
3. Connect the power cord and any peripheral devices. Refer to Chapter 1, “Server Features,” for the location of all rear panel connectors.



WARNING: To reduce the risk of electric shock or fire, do not plug telecommunications/telephone connectors into the network interface controller (NIC) receptacle.

4. Power up the server by pressing the power button on the front of the server.
5. Before selecting the operating system, press the **F8** key during POST if you are using an ATA model to configure RAID array. The default configuration is RAID 0.

IMPORTANT: To avoid automatic RAID 0 configuration in ATA models, you must configure an array before OS installation. If you change the RAID level, you must re-install the operating system. Refer to Chapter 6 for more information on configuring arrays.

6. To select the type of operating system and set the date and time, run ROM-Based Setup Utility (RBSU) by pressing the **F9** key when prompted during initial boot.

For more information on RBSU, refer to Chapter 5, “Server Configuration and Utilities,” or refer to the *HP ROM-Based Setup Utility User Guide*.

7. Insert the SmartStart CD into the CD-ROM drive. Refer to the “Configuring the Server” section in this guide for instructions. For SmartStart CD initialization procedures, refer to Chapter 5, “Server Configuration and Utilities,” or the ProLiant Essentials Foundation Pack shipped with the server.
8. Install the operating system software.
9. To manage the server, install Insight Manager, found on the Management CD. For Management CD initialization procedures, refer to the ProLiant Essentials Foundation pack shipped with the server.

IMPORTANT: You must install and use Insight Manager to benefit from the Pre-Failure Warranty on processors, hard drives, and memory modules.

10. Install any application software needed.
11. Register the server at
register.hp.com

Configuring the Server

The server setup utility, RBSU, can be used to configure the server and options. To initiate RBSU, press the **F9** key when prompted during start up.

The SmartStart CD contains ROMPaq and updated drivers, and assists with operating system installation. To use the SmartStart CD:

1. Locate the SmartStart CD in the ProLiant Essentials Foundation Pack.
2. Power up the server, and then press the CD-ROM drive eject button.
3. Insert the SmartStart CD into the CD-ROM drive with the labeled side up. Handle the CD by its edges, not by the flat surfaces of the disc.

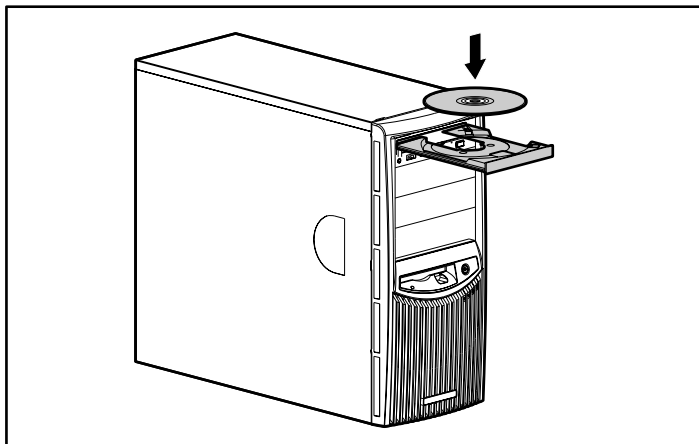


Figure 2-3: Inserting a CD into the CD-ROM drive

4. When the busy indicator on the CD-ROM turns green, the SmartStart sequence begins. Refer to the SmartStart CD for more information.

Server Registration

For server registration information, refer to the ProLiant Essentials Foundation Pack shipped with the server or refer to

register.hp.com

Hardware Options Installation

This chapter provides procedures for installing, removing, and replacing hardware options for the ProLiant ML310 server.



WARNING: There is a risk of personal injury from hazardous energy levels. The installation of options and the routine maintenance and service of this product must be performed by individuals who are knowledgeable about the procedures, precautions, and hazards associated with equipment containing hazardous energy circuits.



CAUTION: Electrostatic discharge (ESD) can damage electronic components. Be sure that you are properly grounded (earthed) before beginning any installation procedure. Refer to Appendix B, “Electrostatic Discharge,” for more information.

Preparing the Server

Before installing or removing any options, prepare the server by performing the following procedures.

Powering Down the Server

To power down the server:



CAUTION: Failure to follow these instructions could result in damage to equipment or loss of information.

1. Back up the server data and record configuration information.
2. Shut down the operating system as directed in the operating system instructions.
3. Power down the server by pressing the power button on the front of the server, if necessary.
4. Remove the power cord.



WARNING: To reduce the risk of injury from electric shock or damage to the equipment when installing hardware, be sure that the power to the server is turned off. Remove any AC power cords to completely disconnect power from the server. The front panel power button may not completely remove power to the server.

5. Disconnect any other external equipment from the server.

Removing the Front Bezel

To remove the front bezel:



CAUTION: To prevent damage to equipment or loss of information, be sure that the server is powered down, all cables are disconnected from the back of the server, and the power cord is disconnected from the grounded (earthed) AC outlet before removing the front bezel.

1. Follow the steps in “Powering Down the Server” in this chapter.
2. Pull up on the latch at the bottom of the front bezel, applying enough pressure to release the latch from the chassis (1).
3. Swing the bezel upward, and then slide it out and away from the chassis (2). You may need to exert a small amount of force to release the bezel from the chassis.

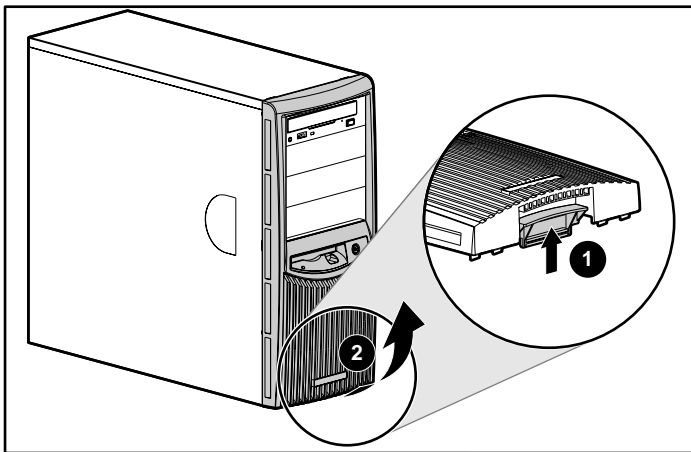


Figure 3-1: Removing the front bezel

To replace the front bezel, reverse steps 2 and 3.

NOTE: When replacing the front bezel, be sure that the top hinge points are properly placed in the chassis before rotating the front bezel into its original position.

Removing the Access Panel

To remove the access panel:



WARNING: To reduce the risk of personal injury from hot surfaces, allow the internal server components to cool before touching them.



CAUTION: To prevent damage to equipment or loss of information, be sure that the server is powered down, all cables are disconnected from the back of the server, and the power cord is disconnected from the grounded (earthed) AC outlet before removing the access panel.



CAUTION: Do not operate the server while the access panel is removed. This panel is an integral part of the cooling system and removing the panel while the server is running may adversely affect data integrity.

1. Follow the steps in “Removing the Front Bezel” in this chapter.
2. Remove the thumbscrew located on the left side of the front chassis (1).
3. Slide the access panel forward, pull from the top of the access panel, and then lift the panel from the chassis (2).

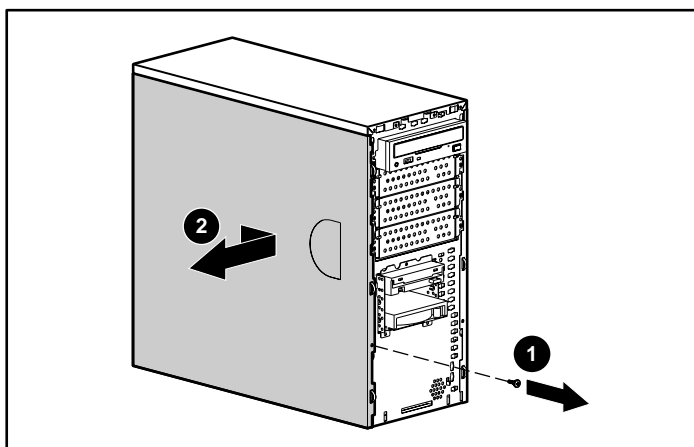


Figure 3-2: Removing the access panel

NOTE: Turn the access panel over to locate the System Configuration label. This label provides information about the system board of the server.

To replace the access panel, reverse steps 2 and 3.

Removing Bezel Blanks

When installing a device other than a hard drive into a removable media bay, it is necessary to remove the corresponding bezel blank from the front bezel. To remove a bezel blank:



CAUTION: To prevent damage to equipment or loss of information, be sure that the server is powered down, all cables are disconnected from the back of the server, and the power cord is disconnected from the grounded (earthed) AC outlet before removing the front bezel.

NOTE: It is not necessary to remove a bezel blank when installing a hard drive into a removable media bay.

1. Follow the procedures in “Removing the Front Bezel” in this chapter.
2. On the back of the front bezel, pinch the tabs on each end of the bezel blank toward each other (1), and then push the bezel blank through the front bezel (2).

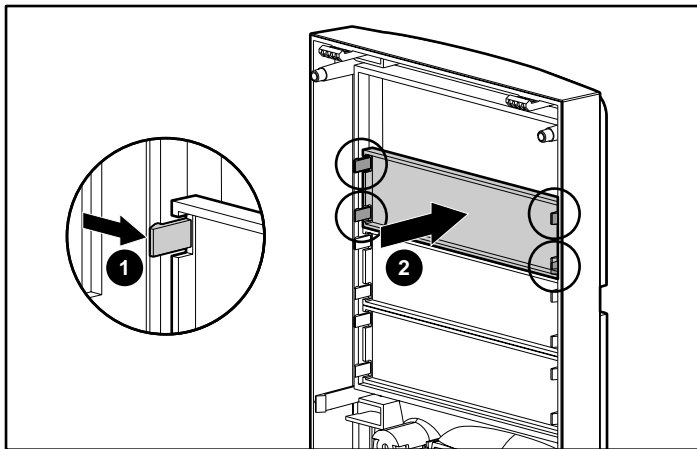


Figure 3-3: Removing a bezel blank

To replace a bezel blank, reverse steps 1 and 2.

Removing a Drive Tray

NOTE: The drive trays in the removable media bays can be used to mount internal 3.5-inch devices. The rails mounted inside the drive trays can be removed and used to mount other devices in the removable media bays.

When installing a device into a removable media bay, it is necessary to first remove the drive tray. To remove a drive tray from a removable media bay:

1. Follow the steps in “Removing the Access Panel” in this chapter.
2. Remove the screws on each side of the drive tray (1).
3. Gently slide the drive tray out of the front of the chassis (2).

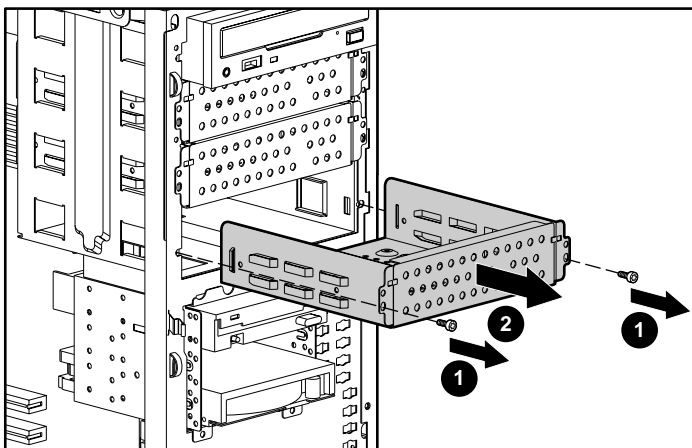


Figure 3-4: Removing a drive tray

To replace a drive tray, reverse steps 2 and 3.

Storage Devices

This section covers removal and replacement procedures for the storage devices supported by the server.

Refer to Chapter 1, “Server Features,” for the location and dimensions of the server drive bays, before installing a device.



CAUTION: To prevent damage to equipment or loss of information, be sure that the server is powered down, all cables are disconnected from the back of the server, and the power cord is disconnected from the grounded (earthed) AC outlet before removing the front bezel or access panel.

IMPORTANT: When you add or remove a component or change a security feature, you must reconfigure the server to recognize these changes. If the system configuration is incorrect, the server will not work properly and you may receive error messages on the screen.

Removing a Hard Drive From a Hard Drive Bay

To remove a 3.5-inch hard drive:

1. Follow the steps in “Removing the Access Panel” in this chapter.
2. Disconnect the power and data cables from the back of all devices in the hard drive compartment.

Figure 3-5 illustrates cable removal from SCSI hard drives.

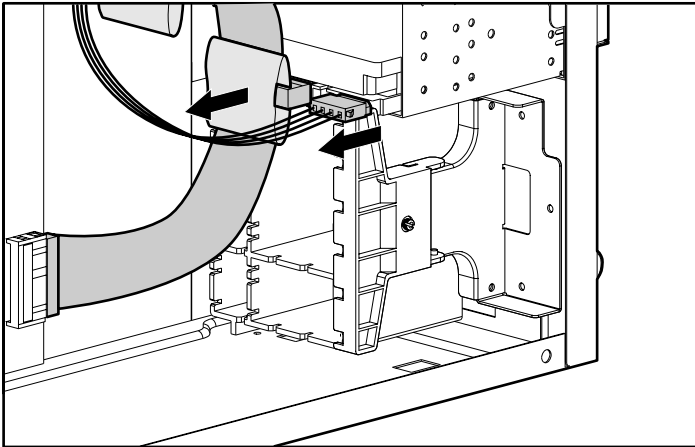


Figure 3-5: Disconnecting the hard drive cables (SCSI model)

Figure 3-6 illustrates cable removal from ATA hard drives.

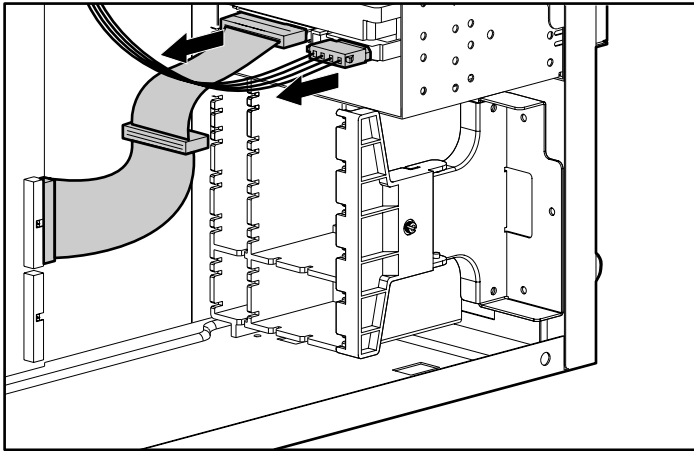


Figure 3-6: Disconnecting the hard drive cables (ATA model)

3. Remove the three shipping screws, press the tabs on each side of the drive compartment, and then pull the drive compartment from the chassis as shown in Figure 3-8.

4. Remove the two screws on each side of the drive (1), and then gently pull the drive out of the drive bay (2).

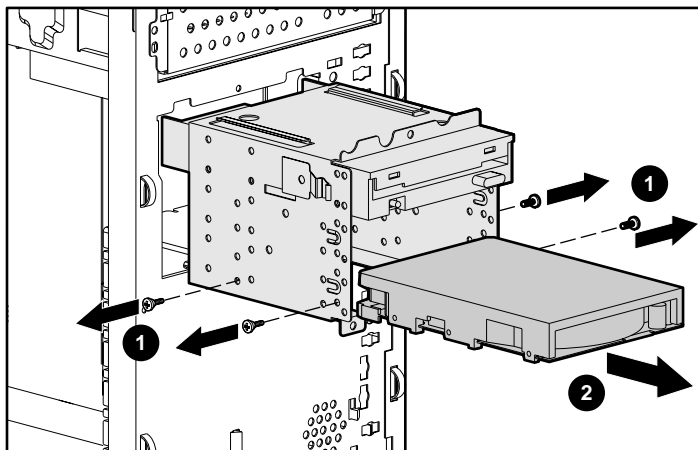


Figure 3-7: Removing a hard drive

5. Slide the drive compartment back into the chassis, and then replace the three hard drive compartment shipping screws.
6. Connect the power and data cables to the back of all devices.
7. Replace the access panel and the front bezel.
8. Restore power to the server.

Installing a Hard Drive Into a Hard Drive Bay

To install a 3.5-inch hard drive:

1. Follow the steps in “Removing the Access Panel” in this chapter.
2. Disconnect the power and data cables from the back of all devices located in the hard drive compartment.
3. Remove the three shipping screws (1), press the tabs on each side of the drive compartment (2), and then pull the drive compartment out of the chassis (3).

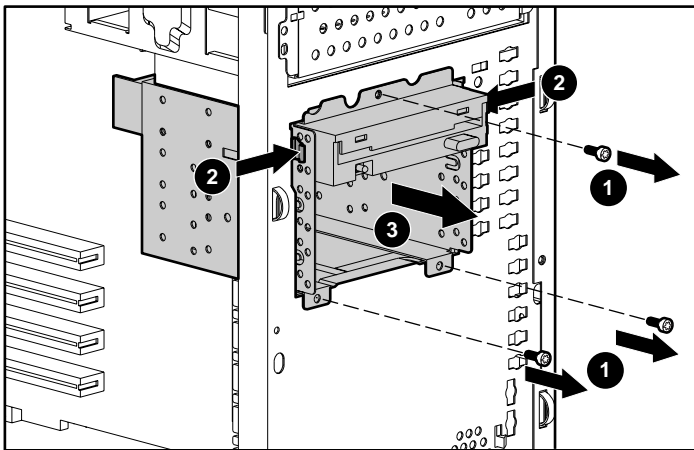


Figure 3-8: Removing the drive compartment

4. Configure the device.
 - For SCSI devices, set the SCSI ID on the drive. You must manually set the SCSI ID on each device to a unique value in the range of 0 to 6 for each SCSI bus. Refer to the documentation provided with the device for instructions on how to set the SCSI ID.
 - For ATA devices, be sure that the jumper on the drive is set to Cable Select (CS) so that the drive device ID is determined by the cable. Refer to Chapter 4, “Cabling Guidelines,” for further information.

NOTE: If you have two drives, connect one on each ATA channel. The performance of the array is enhanced with one drive per channel.

5. If applicable, remove all terminating jumpers from third-party SCSI devices (HP SCSI cables are terminated).

NOTE: Using a non-LVD (single-ended) SCSI device impacts the SCSI bus performance of the server. Any SCSI devices that are Wide-Ultra or older are single-ended.

6. Locate the hard drive screws on the front of the chassis (1).

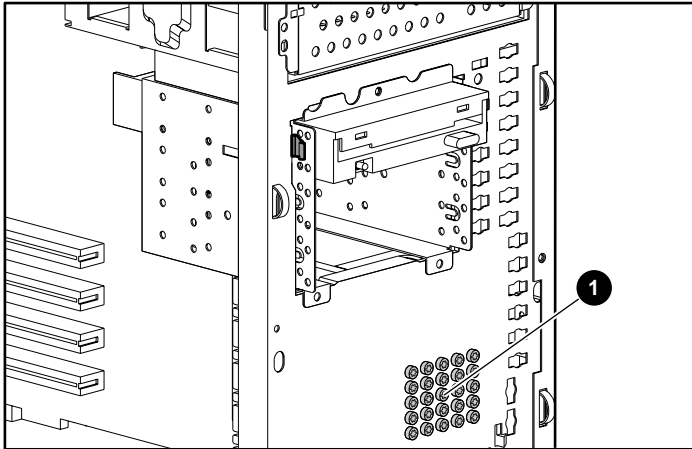


Figure 3-9: Locating the hard drive screws

7. Slide the drive into the drive bay (1), and then secure it with two screws on each side of the drive compartment (2).

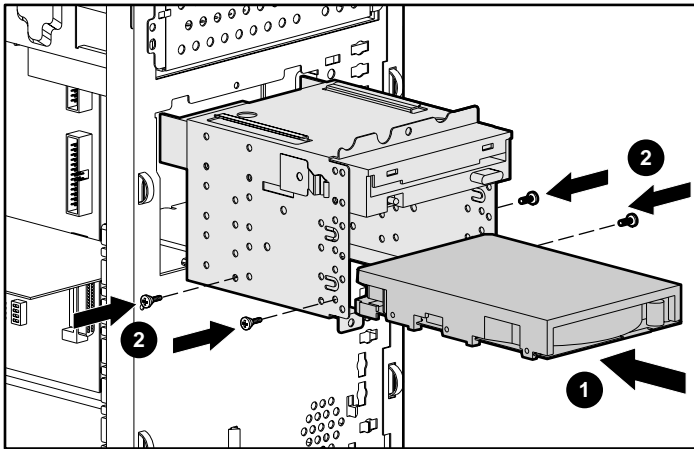


Figure 3-10: Installing a 3.5-inch hard drive

8. Slide the drive compartment back into the chassis, and then replace the three shipping screws.
9. Connect the power and data cables to the back of all devices. Refer to Chapter 4, “Cabling Guidelines,” for cabling information specific to the server model.
10. Replace the access panel and the front bezel.
11. Restore power to the server.

Installing a Hard Drive into a Removable Media Bay

The server ships standard with four removable media bays. The top 5.25-inch bay is occupied by an IDE CD-ROM drive. The remaining three 5.25-inch bays are available for removable media devices. You can install three half-height devices, or one full-height device and one half-height device, into these bays.

To install a hard drive using a drive tray:

1. Follow the steps in “Preparing the Server” in this chapter.
2. Configure the device.
 - For SCSI devices, set the SCSI ID on the drive. You must manually set the SCSI ID on each device to a unique value in the range of 0 to 6 for each SCSI bus. Refer to the documentation provided with the device for instructions on how to set the SCSI ID.
 - For IDE (ATAPI or ATA) devices, be sure that the jumper on the drive is set to Cable Select (CS) so that the drive device ID is determined by the cable. Refer to Chapter 4, “Cabling Guidelines,” for further information.
3. Locate the hard drive screws. Refer to Figure 3-9 for the location.
4. Set the drive into the drive tray (1).
5. Tighten the four screws on the bottom of the drive tray to secure the drive to the drive tray (2).

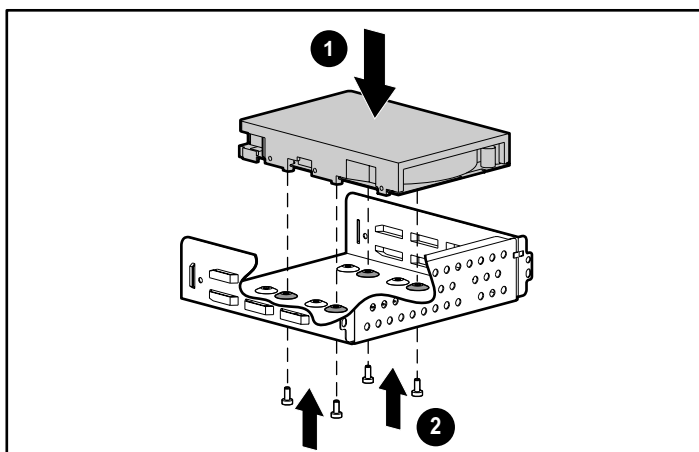


Figure 3-11: Installing a hard drive into a removable media bay drive tray

6. Slide the drive tray into the removable media bay (1), and then secure it with a screw on each side of the drive tray (2).

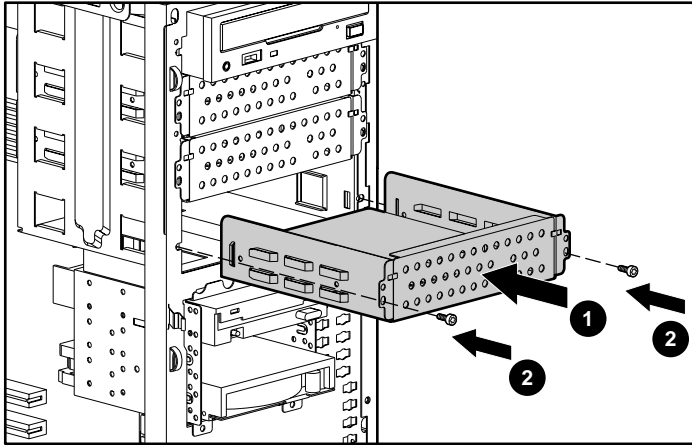


Figure 3-12: Installing a hard drive into a removable media bay

7. Connect the power and data cables to the back of all devices. Refer to Chapter 4, “Cabling Guidelines,” for cabling information specific to the server model.
8. Replace the access panel and the front bezel.
9. Restore power to the server.

Removing a Hard Drive or Other Device from a Removable Media Bay

To remove a device from a removable media bay:

1. Follow the steps in “Removing the Access Panel” in this chapter.
2. Disconnect the power and data cables from the back of the device.
3. Remove the screws on each side of the device (1), and then gently slide the device out from the front of the chassis (2).

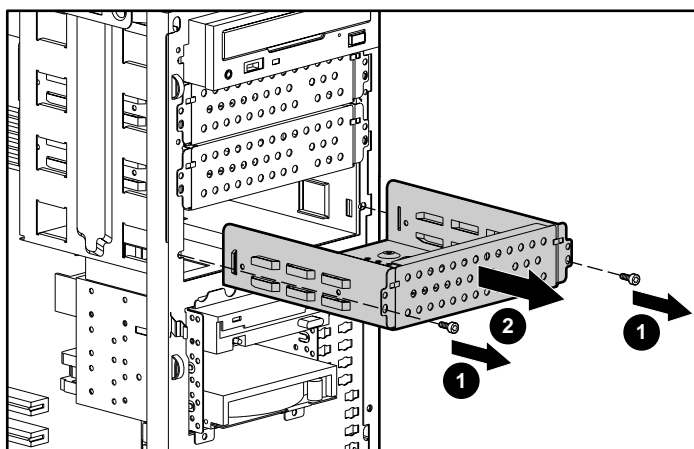


Figure 3-13: Removing a device from the removable media bay

4. Install another device or a drive tray. Replace the bezel blank (or blanks) if no device is installed. Refer to “Removing Bezel Blanks” and “Removing a Drive Tray” in this chapter.
5. Replace the access panel and the front bezel.
6. Restore power to the server.

Installing a Tape Drive or Other Removable Media Device

All ProLiant ML310 server models ship standard with four removable media bays. The top 5.25-inch bay is occupied by an IDE CD-ROM drive. The remaining three 5.25-inch bays are available for removable media devices. You can install three half-height devices, or one full-height device and one half-height device, into these bays.

NOTE: If installing an ATAPI tape drive, refer to “Cabling an ATAPI Tape Drive” in Chapter 4 for specific cabling information.

To install a tape drive:

1. Follow the procedures in “Preparing the Server” in this chapter.
2. Configure the device.
 - For SCSI devices, set the SCSI ID on the drive. You must manually set the SCSI ID on each device to a unique value in the range of 0 to 6 for each SCSI bus. Refer to the documentation provided with the device for instructions on how to set the SCSI ID.
 - For IDE (ATAPI or ATA) devices, be sure that the jumper on the drive is set to Cable Select (CS) so that the drive device ID is determined by the cable. Refer to Chapter 4, “Cabling Guidelines,” for further information.

3. Remove the rails from the drive tray, and then install them onto the tape drive. Using a Torx T-15 tool, remove the guide screws, (1) and then remove the rails from a removable media bay blank (2).

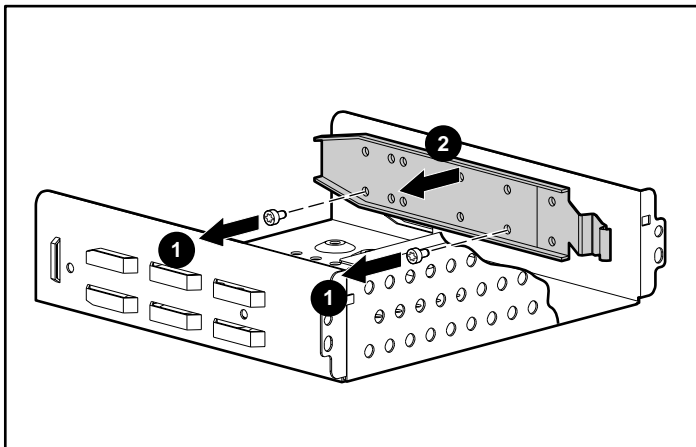


Figure 3-14: Removing the rails from the drive tray

Refer to “Removing a Drive Tray” in this chapter for more information.

4. After the rails are attached to the tape drive, slide the drive into the drive bay.

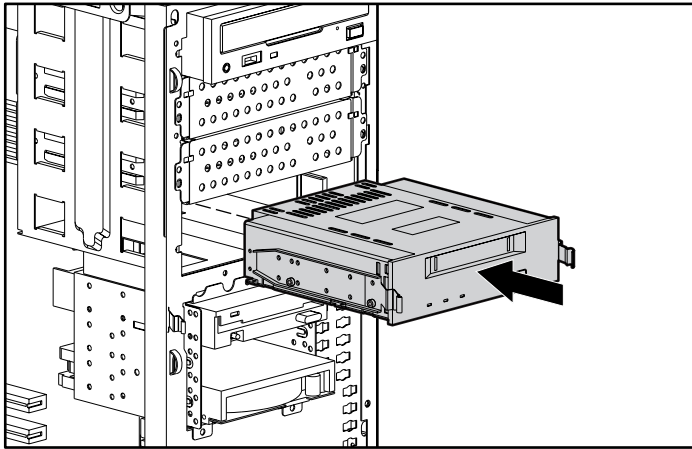


Figure 3-15: Installing a tape drive

5. Connect the data and power cables to the back of the drive, as instructed in Chapter 4, “Cabling Guidelines.”
6. Replace the access panel and the front bezel.
7. Restore power to the server.

Installing the Two-Bay Hot-Plug SCSI Drive Cage Into a Removable Media Bay

To install the two-bay hot-plug SCSI drive cage into the removable media bay:

1. Remove the bezel that ships attached to the drive cage:
 - a. Using a Torx T-10 tool, loosen the two screws (1).
 - b. Remove the screws from the bezel (2).
 - c. Remove the bezel from the drive cage (3).

NOTE: For additional information about the two-bay hot-plug SCSI drive cage, refer to the *HP Internal Two-Bay Hot-Plug SCSI Drive Cage Installation Instructions*.

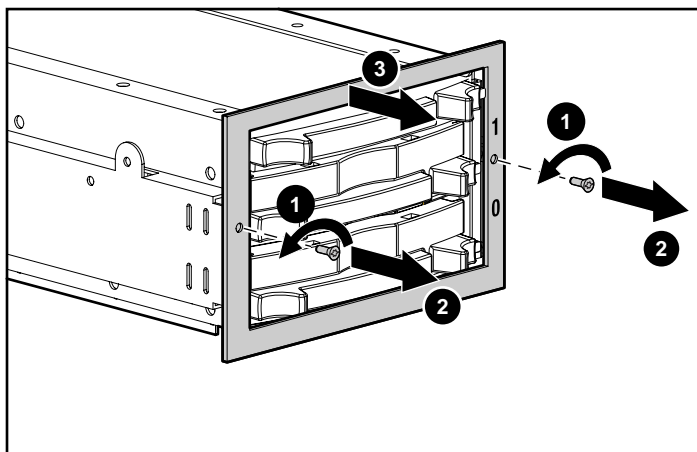


Figure 3-16: Removing the bezel from the drive cage

IMPORTANT: Be sure that the unit identification numbers (0 and 1) appear on the right side of the drive cage front panel.

For identification purposes, the number 2 appears on the back of the bezel shipped with the option kit.

2. Reverse step 1 to install the bezel from the Two-Bay Hot-Plug SCSI Drive Cage option kit.

3. Remove two media bay blanks and move the CD-ROM drive to the lowest media bay to prepare a space for the drive cage:
 - a. Remove the screws from the media bay blanks (1).
 - b. Remove the media bay blanks from the media bays (2).

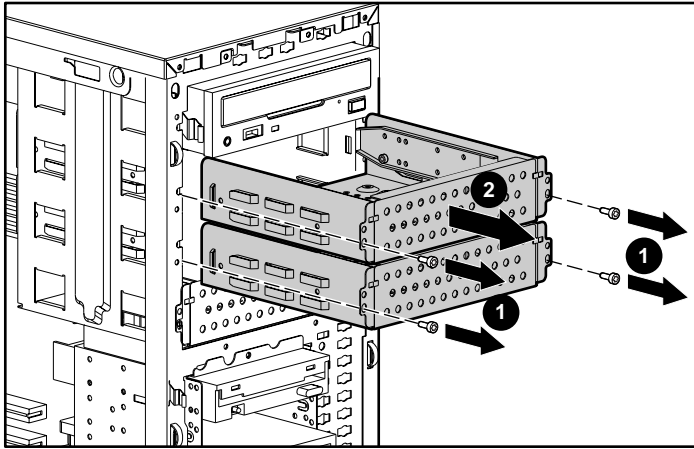


Figure 3-17: Removing media bay blanks

- c. Press the release latches on the CD-ROM drive (1).
- d. Remove the CD-ROM drive from the media bay (2).

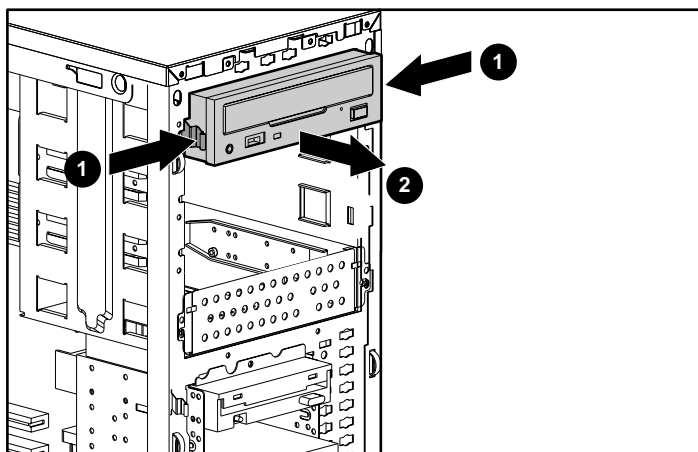


Figure 3-18: Removing the CD-ROM drive

- e. Insert the CD-ROM drive into the third media bay.

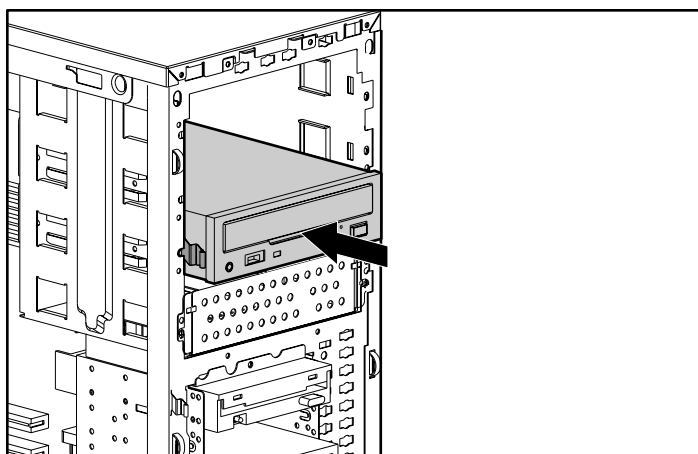


Figure 3-19: Moving the CD-ROM drive

IMPORTANT: The drive cage can be installed only in the top two bays.

Be sure to install the rails on the drive cage using the screws that ship with the two-bay hot-plug SCSI drive cage option kit, rather than the screws removed from the rails.

Be sure to install the right-hand rail on the left side of the drive cage, and the left-hand rail on the right side of the drive cage.

4. Position the rails and two guide screws in the **lower** mounting holes on each side of the drive cage and tighten the screws (1).

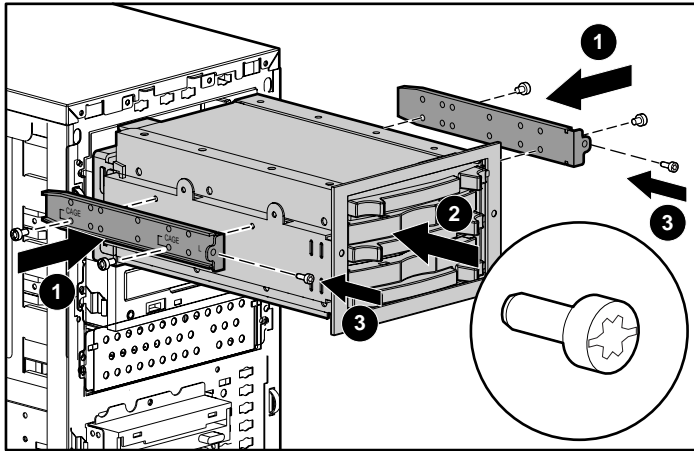


Figure 3-20: Attaching the rails to the drive cage

5. Insert the SCSI cable that ships with the drive cage option kit into the rear of the removable media bay area, and then pull it forward for connection to the SCSI connector on the back of the drive cage.
6. Locate the power cable inside the server and connect it to the power connector on the back of the drive cage. Refer to “Cabling a Two-Bay Hot-Plug SCSI Drive Cage” in Chapter 4 for more information.

IMPORTANT: Always use the SCSI cable that ships with the drive cage option kit. Other available SCSI cables may not support Ultra3 SCSI.

7. Slide the drive cage into the removable media bay until it locks into place (2).
8. Screw the ends of the rails into the chassis on both sides (3).
9. Connect the other end of the SCSI cable to the desired internal SCSI connector.

Refer to the *HP Internal Two-Bay Hot-Plug SCSI Drive Cage Installation Instructions* for additional information.

Installing an Expansion Board

Figure 3-21 and Table 3-1 identify the location of expansion slots.

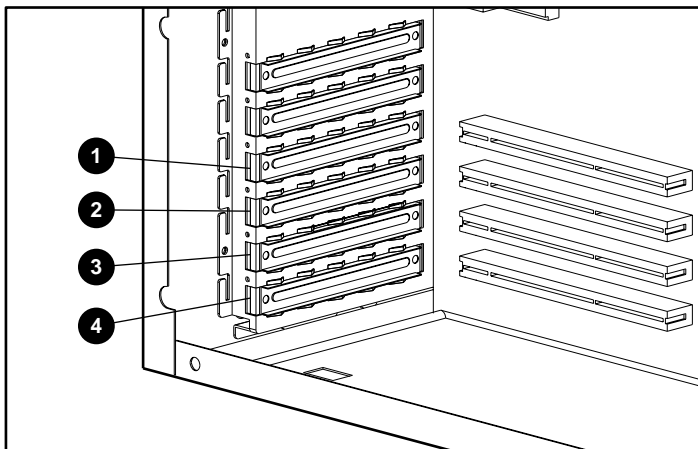


Figure 3-21: Expansion slots

Table 3-1: Expansion Slots

Item	Slot Type	Slot Number
1	3.3-volt, 33-MHz 64-bit PCI	1
2	3.3-volt, 33-MHz 64-bit PCI	2
3	3.3-volt, 33-MHz 64-bit PCI	3
4	3.3-volt, 33-MHz 64-bit PCI	4

To install an expansion board:



CAUTION: Electrostatic discharge (ESD) can damage electronic components. Be sure that you are properly grounded (earthed) before beginning any installation procedure. Refer to Appendix B, “Electrostatic Discharge,” for more information.

1. Follow the steps in “Removing the Access Panel” in this chapter.
2. From inside the chassis, push the expansion slot cover through the rear of the chassis.

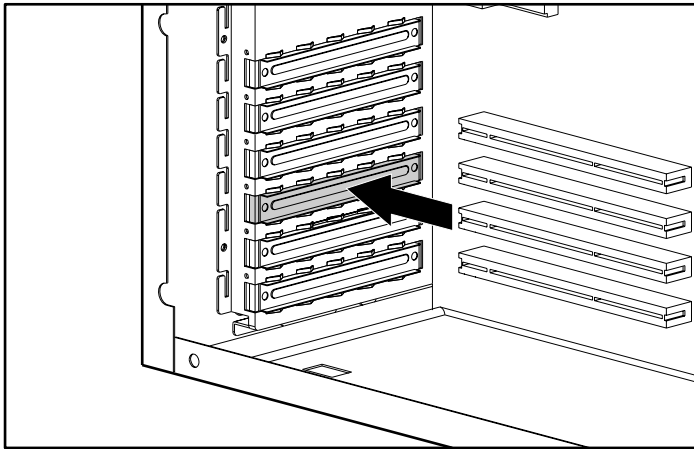


Figure 3-22: Removing the expansion slot cover

3. If installing a full-length PCI card, release the expansion board retainer by loosening the screw (1) and turning the retainer back towards the front of the chassis (2).

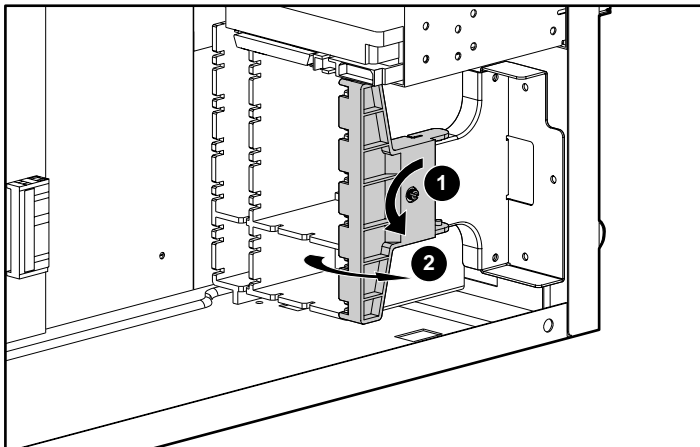


Figure 3-23: Releasing the expansion board retainer

4. Insert the expansion board into the slot, and then secure it with a screw on the top of the board.

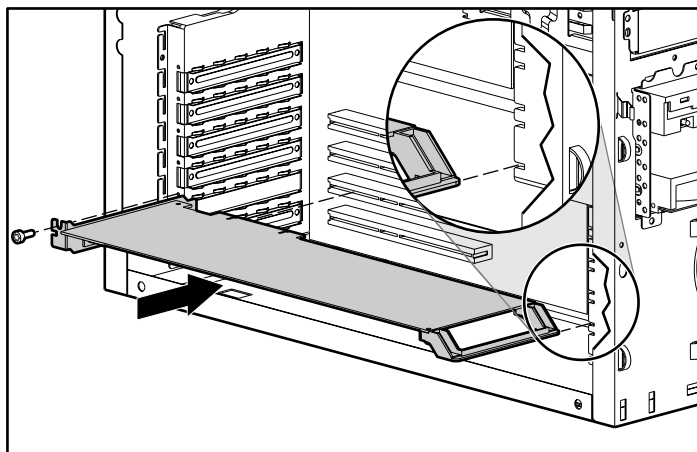


Figure 3-24: Installing an expansion board

5. Connect any cables to the expansion board.
6. Reinstall the expansion board retainer by reversing step 3.
7. Replace the access panel and front bezel.

To remove an expansion board, reverse steps 1 through 7.

Memory Modules

Technical Information and Important Guidelines



CAUTION: To prevent damage to equipment or loss of information, be sure that the server is powered down, all cables are disconnected from the back of the server, and the power cord is disconnected from the grounded (earthed) AC outlet before removing the access panel.



CAUTION: Electrostatic discharge (ESD) can damage electronic components. Be sure that you are properly grounded (earthed) before beginning any installation procedure. Refer to Appendix B, "Electrostatic Discharge," for more information.



CAUTION: When handling a DIMM, be careful not to touch any of the contacts. Doing so may damage the component.

When installing DIMMs, you must follow these guidelines:

- Memory modules must be industry-standard, ECC Registered PC2100 DDR SDRAM DIMM and support CAS Latency 2.5 (CL=2.5).
- Do not mix ECC and non-ECC SDRAM DIMMs. If different types of DIMMs are mixed, the server will not properly function.
- 128-MB, 256-MB, 512-MB, and 1-GB DIMMs are supported.

Removing a Memory Module

To remove a DIMM:

1. Follow the steps in “Removing the Access Panel” in this chapter.
2. Press outward on both latches of the DIMM socket at the same time (1). This releases the DIMM and pushes it partially out of the socket.
3. Lift the DIMM from the socket (2).

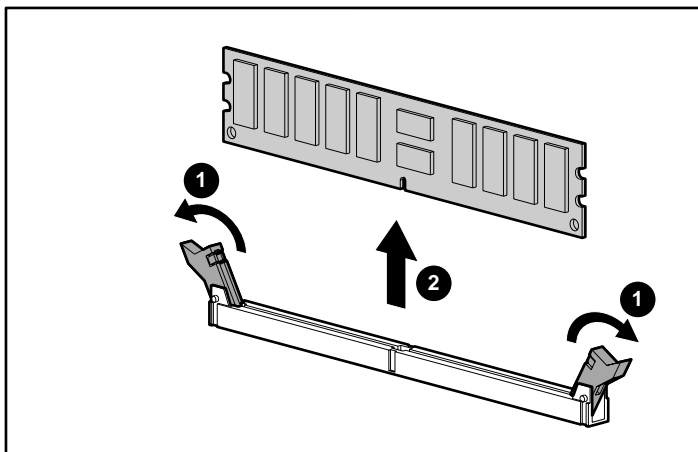


Figure 3-25: Removing a DIMM

Installing a Memory Module

The server comes standard with one ECC Registered PC2100 DDR SDRAM DIMM. Additional DIMMs are available to upgrade the memory up to 4 GB. The server has four DIMM sockets located on the system board.

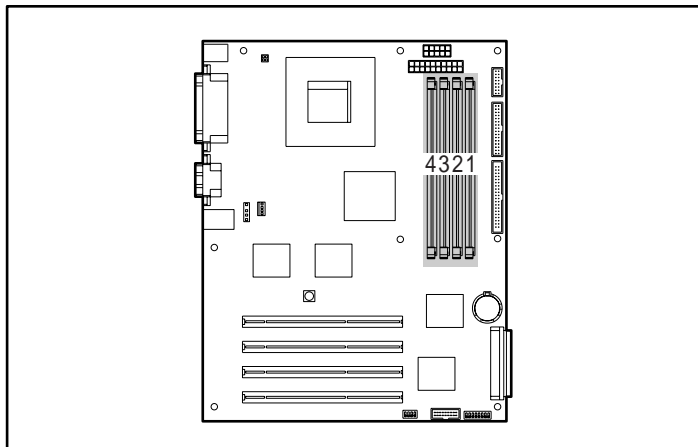


Figure 3-26: Locating DIMM sockets

Table 3-2: DIMM Sockets

Item	Description
1	DIMM socket 1
2	DIMM socket 2
3	DIMM socket 3
4	DIMM socket 4

To install a DIMM:

NOTE: DIMMs may be installed one at a time. HP recommends that the DIMMs be installed sequentially in slots 1, 2, 3, and then 4.

1. Follow the steps in “Removing the Access Panel” in this chapter.
2. Press outward on both latches of the DIMM socket at the same time (1).
3. Insert the DIMM into the socket (2).



CAUTION: A DIMM can be installed only one way or damage will result. Be sure to match the key slot on the DIMM with the tab on the DIMM socket. Push the DIMM down into the socket, ensuring that it is fully inserted and properly seated.

4. Return latches to the upright position (3).

NOTE: The latches may close automatically when the DIMM is properly inserted.

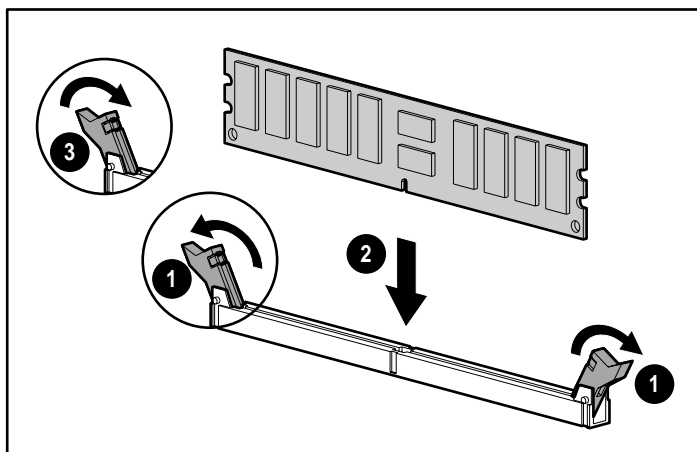


Figure 3-27: Installing a DIMM

Processor

The server comes standard with an Intel Pentium 4 processor.

Removing the Processor

1. Follow the steps in “Removing the Access Panel” in this chapter.
2. Unplug the fan from the system board.
3. Locate the processor, as shown in Figure 3-28.

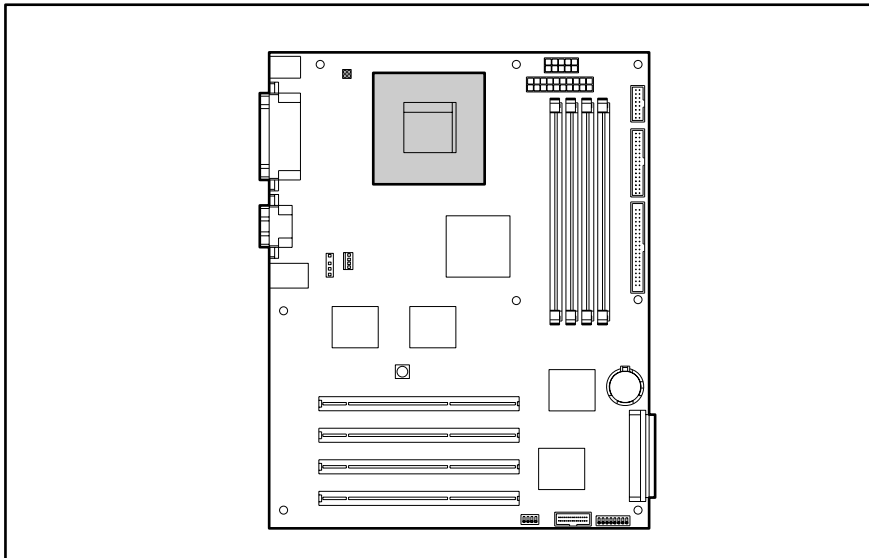


Figure 3-28: Locating the processor socket

4. Push down on the retainer clip levers, and then pull up to remove the levers from the heatsink.
5. Lift the heatsink from the processor.

6. Raise the processor socket lever (1), and then lift the processor out of the socket (2).

IMPORTANT: The processor socket lever must be perpendicular to the system board to unlock the processor unit.

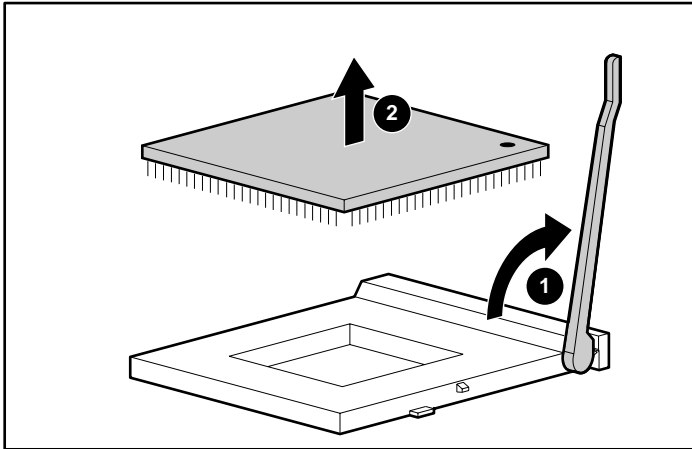


Figure 3-29: Removing the processor from the system board

7. Lower the processor socket lever.
8. Replace the access panel and the front bezel.

Installing the Processor

1. Be sure that all critical data has been backed up.
2. Be sure that the server has the most current ROM version. To update the ROM, visit the following website:

www.compaq.com/support/files/server/us/



CAUTION: Failure to flash the ROM before installing a new processor may cause server failure.

3. Follow the steps in “Removing the Access Panel” in this chapter.
4. Lay the server on the right side, so the open side faces up.
5. Locate the processor socket, as shown in Figure 3-28.
6. Raise the processor socket lever.
7. Place the processor into the socket (1), and then lower the processor socket lever (2). The guide posts and directional key marks on the socket must be aligned with the corresponding slots and marks on the processor.

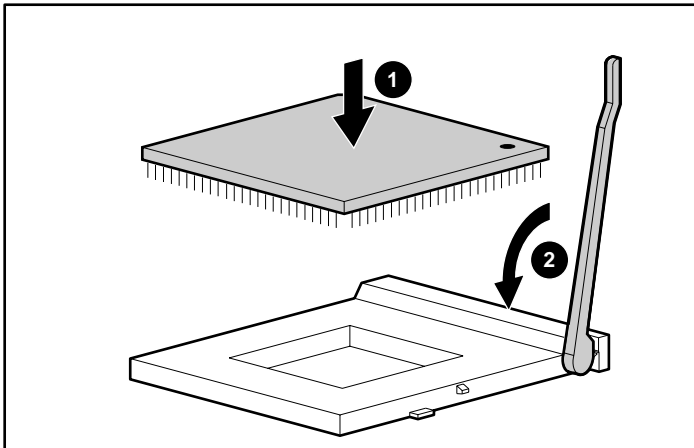


Figure 3-30: Installing a processor

8. Place the heatsink on the processor, aligning the heatsink so the fan cable will reach the CPU heatsink fan connector on the system board.

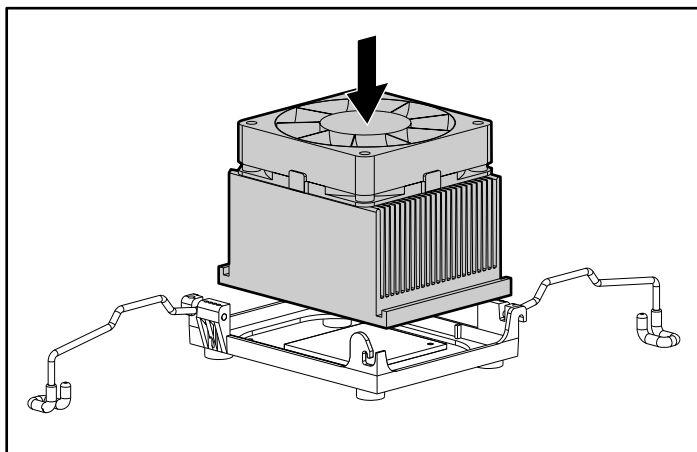


Figure 3-31: Installing the heatsink

9. Hook the processor retainers onto the sides of the heatsink, and latch them over the top. Press down on the heatsink retainer clip levers to secure the heatsink.

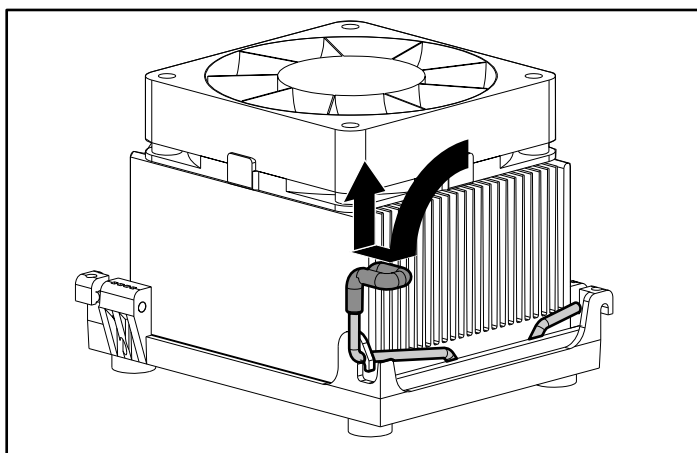


Figure 3-32: Securing the heatsink retainer clips

10. Plug the system fan into the fan connector on the system board.

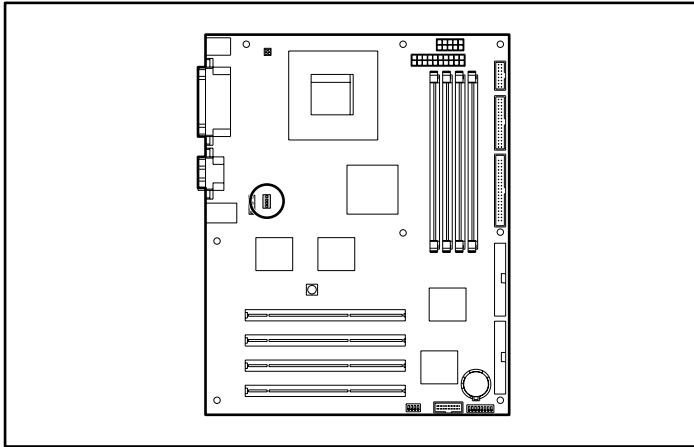


Figure 3-33: Plugging in the system fan

Battery

The server has nonvolatile memory, which requires one battery, located on the system board, to retain server information.

IMPORTANT: Refer to Appendix A, "Regulatory Compliance Notices," for battery disposal information.



WARNING: The system board contains a lithium battery. There is a risk of fire and chemical burn if the battery is handled improperly. Do not disassemble, crush, puncture, short external contacts, dispose of in water or fire, or expose the battery to temperatures higher than 60°C (140°F).



CAUTION: To prevent damage to equipment or loss of information, be sure that the server is powered down, all cables are disconnected from the back of the server, and the power cord is disconnected from the grounded (earthed) AC outlet before removing the access panel.



CAUTION: Electrostatic discharge (ESD) can damage electronic components. Be sure that you are properly grounded (earthed) before beginning any installation procedure. Refer to Appendix B, "Electrostatic Discharge," for more information.

Replacing the Battery

If the server no longer automatically displays the correct date and time, you may need to replace the battery that provides power to the real-time clock. When replacing a battery, use a CR2032 three-volt lithium coin cell battery.

To replace the battery:

1. Follow the steps in “Removing the Access Panel” in this chapter.
2. Locate the battery on the system board. Refer to Figure 3-34 for the location of the battery.

NOTE: If you have expansion boards installed, it may be necessary to remove them to gain access to the battery. Refer to “Installing an Expansion Board” in this chapter for details.

3. Press outward on the latch at the top of the battery holder to release the battery (1). Lift the battery away from the holder (2).

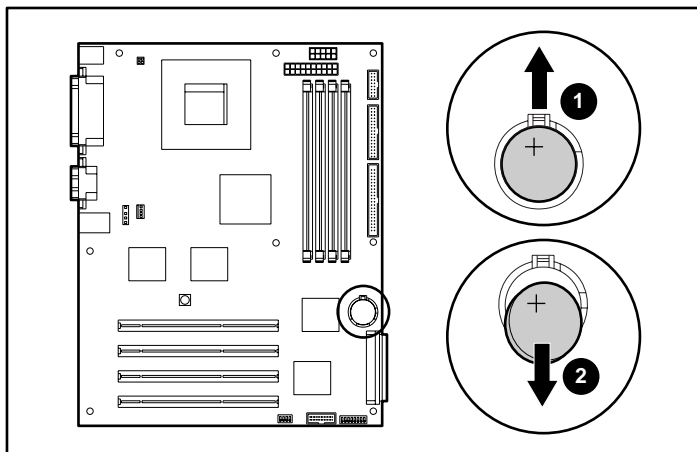


Figure 3-34: Removing the battery from the SCSI system board

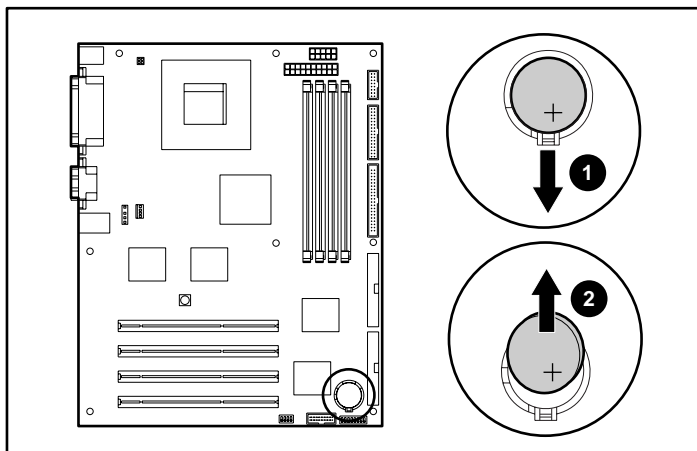


Figure 3-35: Removing the battery from the ATA system board

4. Slide the replacement battery into the proper position with the positive (+) side out.

IMPORTANT: Positive polarity (+) should be positioned out.

5. Replace the access panel and front bezel, and connect the power cables to the server.
6. Run RBSU to reconfigure the server by pressing the **F9** key when prompted during server startup. Refer to Chapter 5, “Server Configuration and Utilities,” or the *HP ROM-Based Setup Utility User Guide*, for more information on RBSU.

Cabling Guidelines

This chapter is an overview of the cabling that resides in the chassis of a ProLiant ML310 server. Information on how to cable SCSI and ATA devices in the server, as well as information about all critical server cabling, is provided.

For detailed information on cable types supported by the server, refer to the *HP ProLiant ML310 Server Cabling Matrix* found at

www.compaq.com/products/servers/



CAUTION: To prevent damage to the equipment, be sure that the server is powered down, all cables are disconnected from the back of the server, and the power cord is disconnected from the grounded (earthed) AC outlet before installing devices.



CAUTION: Electrostatic discharge (ESD) can damage electronic components. Be sure that you are properly grounded (earthed) before beginning any installation procedure. Refer to Appendix B, "Electrostatic Discharge," for more information.

SCSI Cabling

IMPORTANT: The cabling procedures in this section apply only to SCSI models of the ProLiant ML310 server or ATA models with a SCSI option board. Refer to the section, “ATA Cabling,” in this chapter for information on cabling ATA models.

ATA models with a SCSI option board require a SCSI cable not included with the SCSI board option kit. Refer to the *HP ProLiant ML310 Server Cabling Matrix* for cable information specific to your model.

Consider the following guidelines when adding SCSI devices to the server:

- As a general rule, a maximum of seven devices may be added per channel. The server is equipped with one integrated Wide Ultra3 SCSI channel.
- Be sure to remove all terminating jumpers from third-party SCSI devices.
- You must manually set the SCSI ID on each device to a unique value in the range of 0 through 6 for each SCSI bus. Refer to the documentation provided with the device for instructions on how to set the SCSI ID.

Identifying SCSI Components

SCSI Cable Components

The SCSI cable supports up to five SCSI devices and comes with a terminator on the end. One cable is included with SCSI models of the server.

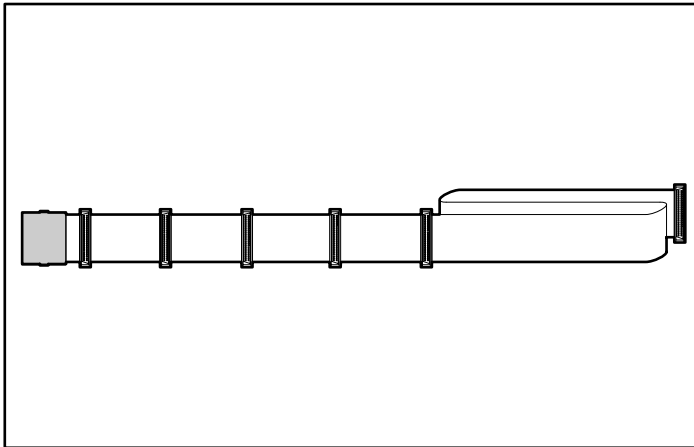


Figure 4-1: SCSI cable with terminator

Internal SCSI Components

Before cabling devices, note the removable media and hard drive compartment locations, identified in Figure 4-2 and Table 4-1. For information about installing optional SCSI devices, refer to Chapter 3, “Hardware Options Installation,” or the documentation included with the device.

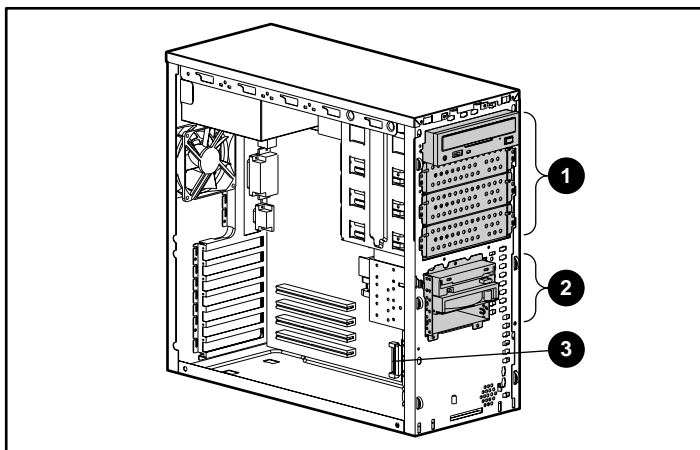


Figure 4-2: Internal SCSI components

Table 4-1: Internal SCSI Components

Item	Description
1	Removable media bay area
2	Hard drive bay area
3	Internal SCSI connector A

68-to-50 pin SCSI Adapter

If installing a device that uses a Fast SCSI-2 interface, you must provide a 68-to-50 pin SCSI adapter (part number 199618-001). This adapter should be installed between the 50-pin interface on the device and the 68-pin SCSI cable connected to the SCSI channel on the system board.

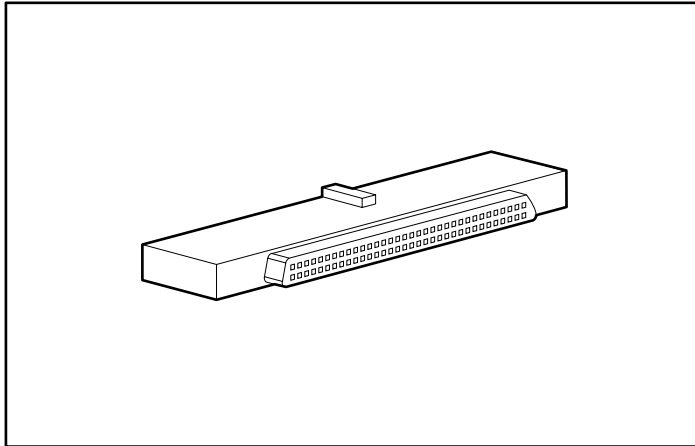


Figure 4-3: 68-to-50 pin (wide-to-narrow) SCSI adapter

Cabling SCSI Devices and Hard Drives

To connect cables from an integrated Wide Ultra3 SCSI controller to an internal SCSI hard drive or other device:

1. Install the device. Refer to “Installing a Hard Drive into a Removable Media Bay” or “Installing a Tape Drive or Other Removable Device,” in Chapter 3 for instructions.
2. Be sure that the SCSI ID is uniquely set for each device.
3. Locate the cable connected to the channel on the system board.

NOTE: HP recommends connecting any non-LVD (single-ended) tape drives or SCSI devices to a separate SCSI cable to avoid a decrease in Ultra2 or Ultra 3 SCSI device performance. A separate SCSI expansion board should be installed to accommodate single-ended drives (drives which are not Ultra2, Ultra 3, or greater).

4. Secure the next available connector on the cable to the hard drive or SCSI device.
5. Secure the next available power connector to the hard drive or SCSI device.

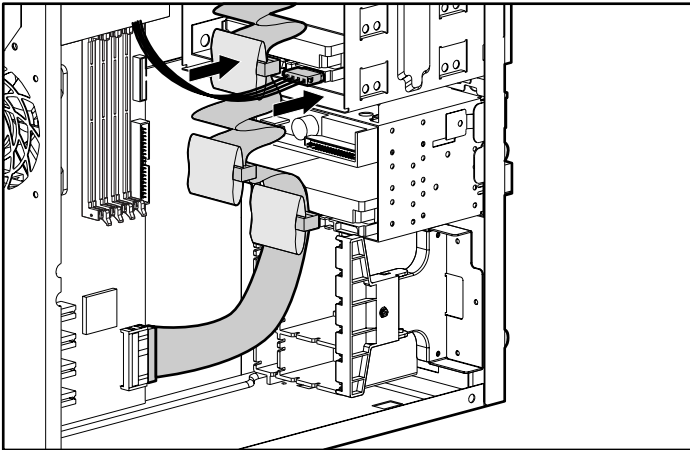


Figure 4-4: Cabling a SCSI hard drive or other device

Cabling a Smart Array Controller

Many configurations are possible when multiple SCSI controllers are added. This section outlines the cabling procedure for an installed Smart Array Controller. Refer to the Smart Array Controller option documentation for further installation information.

To cable the Smart Array Controller:

1. Install the Smart Array Controller as instructed in the option kit documentation.
2. If hard drives are not already installed, follow the appropriate steps in Chapter 3, “Hardware Options Installation,” to install the devices.
3. Locate the cable connected to the SCSI channel on the system board.
4. Remove the cable from the SCSI channel.

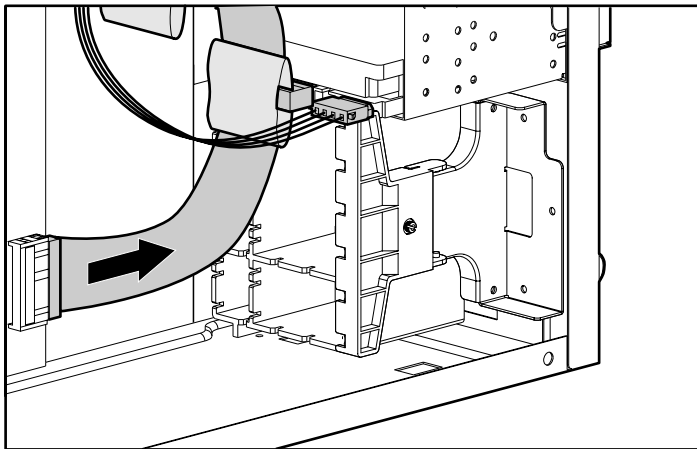


Figure 4-5: Removing the SCSI cable from the system board

Connect the SCSI cable to the Smart Array Controller.

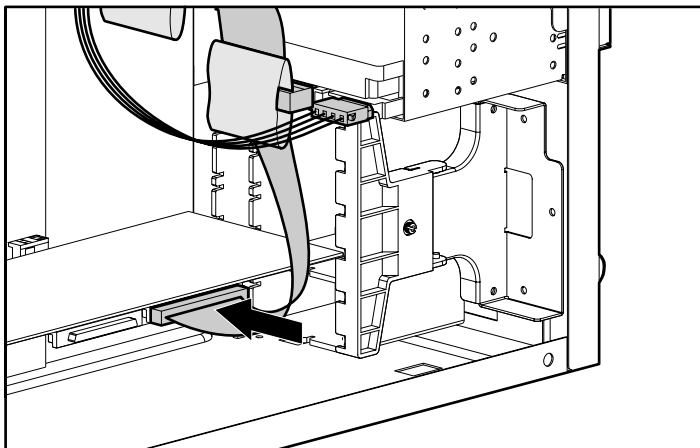


Figure 4-6: Connecting the SCSI cable to the Smart Array Controller

Cabling a Two-Bay Hot-Plug SCSI Drive Cage

To cable the two-bay hot-plug SCSI drive cage:

1. Install the drive cage. Refer to “Installing the Two-Bay Hot-Plug SCSI Drive Cage Into a Removable Media Bay,” in Chapter 3, for instructions.
2. Locate the point-to-point SCSI cable included in the drive cage option kit.
3. Connect one end of the SCSI cable to the drive cage.
4. Connect the other end of the SCSI cable to the controller intended for use with the new drive cage.

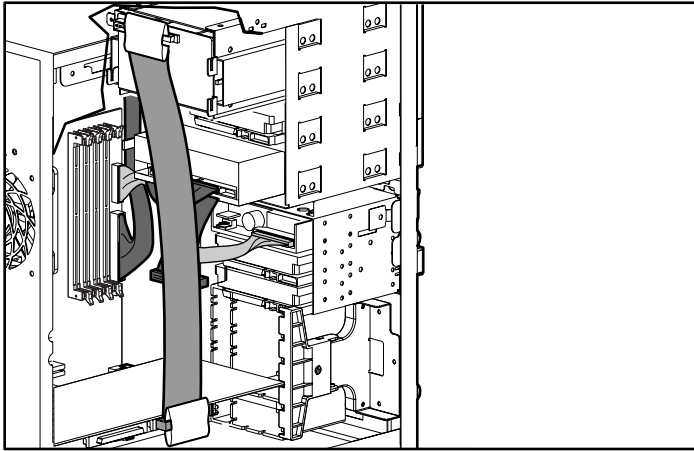


Figure 4-7: Cabling a two-bay hot-plug SCSI drive cage

ATA Cabling

IMPORTANT: The cabling procedures in this section apply only to ATA models of the server. Refer to “SCSI Cabling” in this chapter for information on cabling SCSI models.

ATA models with a SCSI option board require a SCSI cable not included with the option kit. Refer to the *HP ProLiant ML310 Server Cabling Matrix* for cable information specific to your model.

Consider the following guidelines when adding ATA devices to the ProLiant ML310 server:

- A maximum of two devices may be added per channel. The server is equipped with two integrated ATA/100 RAID channels.
- Jumpers on ATA devices should be set to Cable Select (CS), enabling primary and secondary devices to be determined by the cable. Refer to Figure 4-8 for ATA cable information.
- Connect ATA hard drives only to the Integrated ATA/100 RAID controller channels. Do not connect other peripherals to the Integrated ATA/100 RAID controller channels.

Identifying ATA Components

ATA Cable Components

The ATA cable shown in Figure 4-8 supports up to two ATA devices. Two cables are included with ATA models of the server.

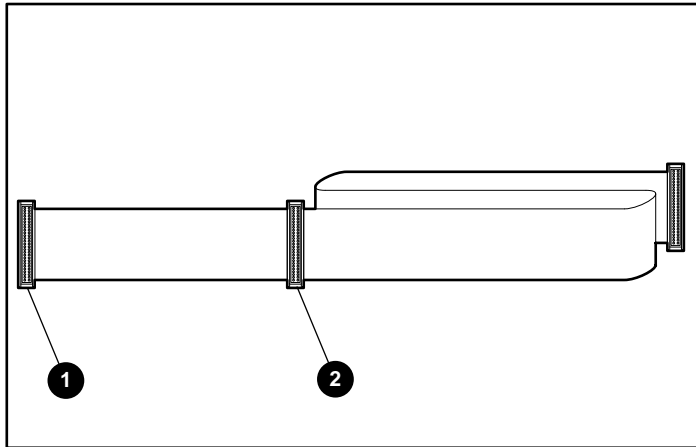


Figure 4-8: ATA cable connectors

Table 4-2: ATA Cable Connectors

Item	Connector
1	Device 0 (primary)
2	Device 1 (secondary)

NOTE: Refer to “Drive Connection Tips” in Chapter 6 for more information on connecting ATA cables.

Internal ATA Components

Before cabling devices, note the removable media and hard drive compartment locations, shown in Figure 4-9 and Table 4-3. For information about installing optional ATA devices, refer to Chapter 3, “Hardware Options Installation,” or the documentation included with the device.

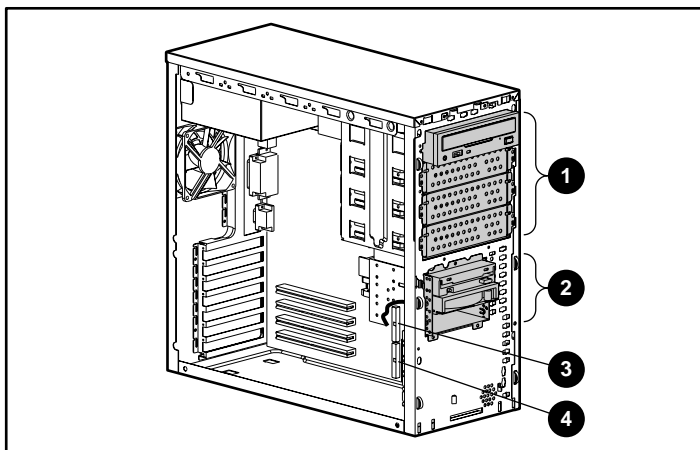


Figure 4-9: Internal ATA components

Table 4-3: Internal ATA Components

Item	Description
1	Removable media bay area
2	Hard drive bay area
3	ATA/100 primary controller
4	ATA/100 secondary controller

Cabling ATA/100 RAID Devices

To connect cables from an Integrated ATA/100 RAID controller to an internal ATA hard drive:

1. Install the device. Refer to “Installing a Hard Drive into a Removable Media Bay” or “Installing a Tape Drive or Other Removable Media Device,” in Chapter 3 for instructions.
2. Be sure that the jumper on the drive or device is set to Cable Select (CS).
3. Secure the next available cable connector to the hard drive or ATA device. Figure 4-10 and Table 4-4 show the cabling configuration when four ATA hard drives are installed. If fewer than four drives are installed, then follow this cabling sequence.

IMPORTANT: Do not connect devices other than hard drives to the connectors on the ATA/100 RAID controller.

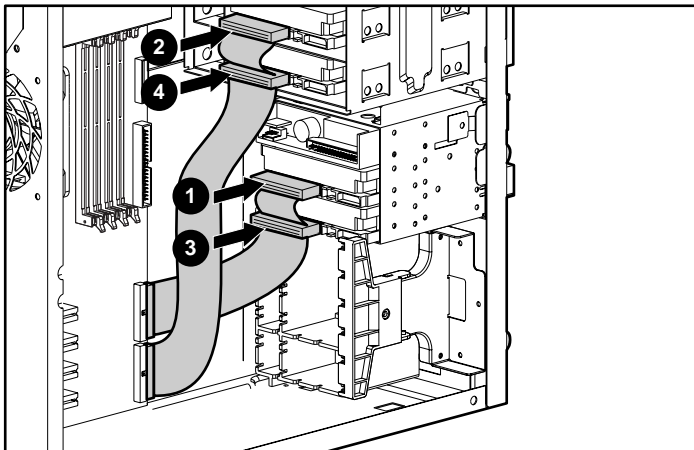


Figure 4-10: ATA cabling sequence

Table 4-4: ATA Cabling Sequence

Step	Channel/Cable	Cable Connector	Drive Location
1	ATA/100 RAID primary controller	Device 0	Hard drive bay 2
2	ATA/100 RAID secondary controller	Device 0	Media bay 3
3	ATA/100 RAID primary controller	Device 1	Hard drive bay 3
4	ATA/100 RAID secondary controller	Device 1	Media bay 4

Note: Refer to Chapter 1, "Server Features," for drive bay locations.

4. Secure the next available power connector to the hard drive or ATA device.

Cabling an ATAPI Tape Drive or Other ATAPI Device

To cable an optional ATAPI tape drive:

1. Install the tape drive into the removable media bay next to the CD-ROM drive by following steps 1 through 5 under “Installing a Tape Drive or Other Removable Media Device” in Chapter 3.
2. Connect the existing ATA cable to the IDE (ATAPI) connector on the system board (1). Refer to “System Board Components” in Chapter 1 for the location of the IDE connector.
3. Secure the cable connector labeled Device 1 to the tape drive (2) and the cable connector labeled Device 0 to the CD-ROM drive (3).

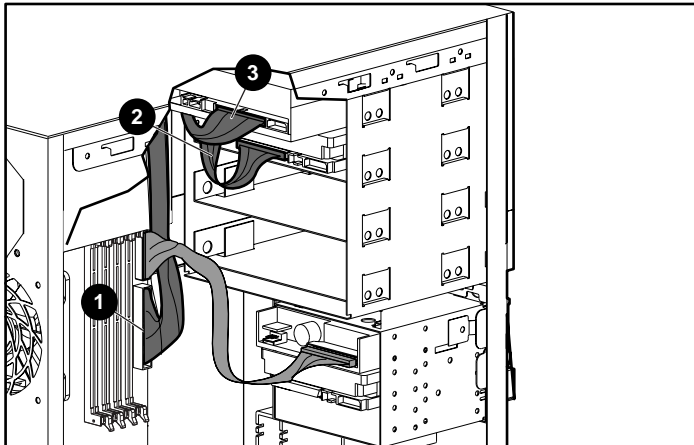


Figure 4-11: Cabling an ATAPI tape drive

4. Secure the next available power connector to the tape drive.

Server Configuration and Utilities

This chapter provides information about the following utilities and support tools included with the ProLiant ML310 server:

- ROM-Based Setup Utility (RBSU)
- Redundant ROM support
- ROMPaq
- SmartStart software
- SmartStart Diskette Builder
- Insight Manager
- Survey Utility
- Diagnostics utility
- Automatic Server Recovery (ASR)
- Power-On Self-Test (POST)
- System Firmware Update

ROM-Based Setup Utility

RBSU performs a wide range of configuration activities, including the following:

- Configuring server devices and installed options
- Viewing server information
- Selecting the operating system
- Selecting the primary boot controller

In addition, RBSU includes other features, which are outlined in “Using RBSU” in this chapter.

For information on RBSU not found in this guide, refer to the *HP ROM-Based Setup Utility User Guide* found in the ProLiant Essentials Foundation Pack.

Navigating RBSU

To make selections within RBSU, use the following keys:

- You can access RBSU by pressing the **F9** key when prompted during startup.
- The arrow keys navigate through the menu system.
- Selections are made by pressing the **Enter** key.
- Selections are cancelled by pressing the **Escape** key.
- Selections and changes are saved by pressing the **F10** key.

Using RBSU

NOTE: Most of the features in RBSU are not required in the setup of the server. The options in this utility are designed to assist with specific server configuration issues.

RBSU is separated into a series of menu selections designed to configure specific areas of the server. The primary menus are as follows:

- System Options
- PCI Devices
- Standard Boot Order (IPL)
- Boot Controller Order
- Date and Time
- Automatic Server Recovery (ASR)
- Server Passwords
- Server Asset Text
- Advanced Options
- Utility Language

System Options

The **System Options** menu configures the basic input/output (I/O) of the server and sets the operating system. The configuration options include the operating system, the external ports, and the ability to control the diskette drive. The following is a list of selections found on this menu with an explanation of each option:

- **OS Selection** selects the primary operating system for the server. Default server settings are automatically set based on the operating system selected.
- **Serial Number** allows you to change the serial number, though HP does not recommend changing it.
- **Embedded COM Port X** sets the configuration for the internal serial port A or B. The configuration options include the address and interrupt request (IRQ). This option can also disable the port.

- **Integrated Diskette Controller** enables or disables the diskette drive. When disabled, **Diskette Write Control**, **Diskette Boot Control**, and **IPL Boot Order** are irrelevant.
- **Embedded NIC Port 1 PXE Support** enables the Pre-boot Execution Environment (PXE) support for NIC Port 1. The **Embedded NIC Port PXE Support** option allows the server to boot to the network and attach to a PXE server with boot images. When enabled, the NIC port is displayed in the **Initial Program Loader (IPL)** list.
- **Diskette Write Control** allows you to configure the write control of the diskette drive. It can be set to read and write or to read only.
- **Diskette Boot Control** enables you to have the server boot from the removable media device.
- **Embedded LPT Port** allows you to enable the embedded LPT Port at the specified resource settings or to disable the option.
- **NumLock Power-On State** enables or disables the power-up state of the **NumLock** key.

PCI Devices

The **PCI Devices** option displays and modifies the configuration of the PCI devices installed in the server. Information for each slot is displayed and the IRQs can be changed. Multiple PCI devices can share an interrupt.

Standard Boot Order (IPL)

The **Standard Boot Order (IPL)** option configures the Initial Program Loader (IPL) device. It controls the search order the server goes through to look for a bootable device.

Boot Controller Order

The **Boot Controller Order** option is used to view and assign the current controller order.

Date and Time

The **Date and Time** option is used to set the server date and time.

Automatic Server Recovery

The **Automatic Server Recovery** menu configures the Automatic Server Recovery (ASR) features and may include the following options:

- **ASR Status** enables or disables ASR. When set to **Disabled**, no ASR features function.
- **ASR Timeout** sets a timeout limit for resetting a server that is not responding. When the server has not responded in the selected amount of time, it automatically resets.
- **Thermal Shutdown** enables or disables the ability of the server to automatically power down when it reaches a dangerous temperature.

Server Passwords

The **Server Passwords** menu configures the password environment of the server. The available options are as follows:

- **Set Admin Password** sets a password to control access to the administrative features of the server. When this password is set, the administrative features of the server cannot be accessed without the correct password being entered.
- **Set Power-On Password** sets a password to control access to the server during power up. When this password is set, the server cannot be powered up without the correct password being entered.
- **Network Server Mode** is a security feature that protects an unattended network server while allowing it to run after a power interruption. When set to **Disabled**, the server operates normally. When set to **Enabled**, the following actions occur:
 - The local keyboard does not function unless the power-on password is entered.
 - When there is not a diskette in the diskette drive, the power-on password is bypassed, allowing the server to start.

- When there is a diskette in the diskette drive, the server does not start unless the power-on password is entered locally.

NOTE: **Network Server Mode** cannot be enabled until a power-on password has been established through the **Set Power-On Password** menu.

- **QuickLock** enables or disables the QuickLock feature. When set to **Enabled**, the keyboard is locked by pressing the **Ctrl+Alt+L** keys. The keyboard remains locked until the password is typed in.

NOTE: If the password is disabled at the power-on key prompt, the QuickLock password feature remains active until the next time the server is turned on.

Server Asset Text

The **Server Asset Text** menu customizes the server-specific text, including the following:

- **Set Server Information Text** defines reference information for the server, such as **Server Name**, **Server Asset Tag**, **Server Primary OS**, and **Other Text**.
- **Set Administrator Information Text** defines reference information for the server administrator, such as **Admin Name Text**, **Admin Phone Number Text**, **Admin Pager Number Text**, and **Other Text**.
- **Set Service Contact Text** defines reference information for the service contact of the server, such as **Service Name Text**, **Service Phone Number Text**, **Service Pager Number Text**, and **Other Text**.
- **Serial Number** allows you to change the chassis serial number.

Advanced Options

The **Advanced Options** menu is used to configure advanced options of the server. The following is a list of selections found in this menu with an explanation of each option:

- **MPS (multi-processor settings) Table Mode** allows you to change the advanced programmable interrupt controller (APIC) table setting. This selection should be automatically set by **OS Selection**, but it allows the user to override the automatic selection.

NOTE: The latest operating systems from Microsoft, Novell, and SCO bypass the use of IRQs and use an APIC. The APIC has been designed to address the issues associated with limited IRQs, multiprocessor systems, and shared interrupts. If you are using the latest operating system, you can let the system automatically configure interrupts for all devices in the server.

- **POST Speed Up** allows you to enable or disable the quick or slow start process. The slow start process performs a complete memory test.
- **F1 Prompt** configures the server to require you to press the **F1** key to proceed during powerup when an error is encountered during the power-up sequence.
- **ROM Selection** toggles the server ROM between the current ROM and the backup ROM.
- **Set CPU Corrected** is used to indicate that a previously failed processor has been corrected.
- **Wake-on-LAN** allows you to enable or disable **Wake Support (PME)**.
- **NMI Debug Button** allows you to disable or enable the **NMI debug** button on the system board.
- **Custom POST Message** allows you to input a message that can be viewed during POST.

Utility Language

The **Utility Language** option is used to set the language in which RBSU is displayed.

Redundant ROM Support

ProLiant ML310 servers enable you to upgrade or configure the ROM safely with redundant ROM support. The server has a 2-MB ROM that acts as two separate 1-MB ROMs. In the standard implementation, one side of the ROM contains the current ROM program version, while the other side of the ROM contains the backup version.

Safety and Security Benefits

When you flash the system ROM, ROMPaq writes over the backup ROM and saves the current ROM as a backup, enabling you to switch easily to the existing ROM version if the new ROM becomes corrupted for any reason. This feature protects the previous ROM version, even if you experience a power failure while flashing the ROM.

Access to Redundant ROM Settings

Use ROMPaq utilities to create a backup ROM image before upgrading the configuration or to restore saved ROM data.

1. Access RBSU by pressing the **F9** key when prompted at startup.
2. Select **ROM Selection** in the **Advanced Options** menu of RBSU.
3. Select one of the ROM banks as the system ROM.
4. Press the **Enter** key.
5. Press the **Esc** key to exit the current menu or press the **F10** key to exit RBSU.
6. Restart the server.

When the server boots, it identifies whether the current ROM bank is corrupt. If a corrupt ROM is detected, the server boots from the backup ROM and alerts you through POST that the ROM bank is corrupt.

Switching ROM images, in the event that RBSU is inaccessible, can also be done by changing the switch settings on the system configuration switch. Refer to Appendix E, “LED Indicators, Switches and Jumpers,” for instructions.

ROMPaq

Using flash ROM in servers allows the firmware (BIOS) to be upgraded with system or option ROMPaq utilities. To upgrade the BIOS, insert a ROMPaq diskette into the diskette drive, remove power from the server, and then power up the server again.

NOTE: Refer to “SmartStart Diskette Builder” in this chapter for instructions on creating a ROMPaq diskette.

The ROMPaq utility then checks the server and provides a choice (if more than one exists) of ROM revisions to which the server can be upgraded. This procedure is the same for both system and option ROMPaq utilities.



CAUTION: Do not power down during a firmware upgrade. A loss of power during upgrade may corrupt the firmware and prevent the server from starting.

SmartStart Software

The SmartStart CD is used to load the server software, thereby achieving a well-integrated server and ensuring maximum dependability and supportability. The SmartStart CD contains diagnostic utilities and ROMPaq tools.

To install the SmartStart software:

1. Press the **F9** key to run RBSU and configure the primary operating system.
2. Locate the SmartStart CD in the ProLiant Essentials Foundation Pack.
3. After you power up the server, press the CD-ROM drive eject button.
4. Insert the SmartStart CD into the CD-ROM drive with the labeled side up. Handle the CD by its edges, not by the flat surfaces of the disc.
5. When the busy indicator turns green, the SmartStart sequence begins.

Refer to the SmartStart documentation included with the server to install the operating system, create updated driver diskettes, and run upgrade utilities.

SmartStart Diskette Builder

The SmartStart CD contains a utility to generate support diskettes in the event that they are needed or if the software cannot be used directly from the SmartStart CD. Support diskettes are punched-out from data stored on the SmartStart CD. The support includes the following:

- Array Configuration Utility (ACU)
- Operating system support
- Server utilities
- Erase utility
- System and Option ROMPaq diskettes

To run the Diskette Builder, use a workstation running the Microsoft Windows 95, Windows 98, Windows NT, Windows XP, or Windows 2000 operating system. You also need several 1.44-MB diskettes. All data on the diskettes will be overwritten. Insert the SmartStart CD into the workstation drive. The CD automatically runs the Diskette Builder utility; however, if the server does not support the auto-run feature, use Windows Explorer to run *CD-ROM drive:\DSKBLDR\DSKBLDR.EXE*.

Insight Manager

Insight Manager is the HP application for easily managing network devices. Insight Manager delivers intelligent monitoring and alerting as well as visual control of devices, and includes the following functions:

- Forwards server alerts and fault conditions
- Monitors fault conditions and server performance
- Controls server security and configuration
- Remotely controls server
- Initiates rapid recovery services

Documentation for Insight Manager is available on the Management CD in *CD-ROM drive:\OVERVIEW.HLP*.

IMPORTANT: You must install and use Insight Manager to benefit from the Pre-Failure Warranty on processors, hard drives, and memory modules.

Survey Utility

Survey Utility is an online information-gathering agent for Microsoft Windows, Novell NetWare, and Linux operating systems that collects critical hardware and software information from various sources. If a significant change occurs between data-gathering intervals, the previous information is marked, and the data file is appended to reflect the latest configuration and changes. This file allows you to keep a historical record of change events for server hardware and software.

Survey Utility automatically runs at startup and on specified time intervals. You can modify the data-gathering interval by modifying the command-line parameters.

For more information on Survey Utility, including installation and application procedures, refer to the *Survey Utility Online Help User Guide* accessed through

www.compaq.com/support/files/server/us/

Perform a search for “Survey Utility,” and then follow the appropriate link.

Diagnostics Utility

The Diagnostics utility tests the operation of the hardware and isolates failed parts, whenever possible. Diagnostic error codes are generated when the Diagnostics utility recognizes a problem. These error codes help identify defective components. A Diagnostics diskette can be made by running the Server Diagnostics file available for download from

www.compaq.com/support/files/server/us/

Automatic Server Recovery

ASR is a feature of ProLiant servers that resets the server in the event of a catastrophic operating system error like a blue-screen, ABEND (abnormal end), or panic. A system failsafe timer, the ASR timer, is started when the System Management driver, also known as the health driver, is loaded. The timer is reset periodically during normal operation, but in the event of operating system failure, the timer expires and restarts the server. ASR increases server uptime by restarting the server within a predetermined amount of time after the server stops responding. The Insight Manager console notifies you in the event of an ASR restart. You can disable ASR from the Insight Manager console.

IMPORTANT: System Management driver must be installed for ASR to function.

Power-On Self-Test

POST is a series of diagnostic tests that checks firmware and assemblies to ensure that the server is functioning properly. This utility runs automatically every time the server is powered up.

Refer to Appendix D, “Troubleshooting,” for the normal power-up sequence and diagnosis of problems encountered during POST.

System Firmware Update

Smart Components for System Firmware Update enables Microsoft Windows NT 4.0 and Windows 2000 operating system administrators to efficiently upgrade and manage system and array controller ROMs. This tool includes the following features:

- Works offline and online
- Integrates with other software maintenance, deployment, and operating system tools
- Automatically checks for hardware, firmware, and operating system dependencies, and installs only the correct ROM upgrades required by each target server

RAID Configuration and Management

This chapter provides an overview of the Integrated ATA RAID Configuration Utility that comes standard with ATA models of the ProLiant ML310 server.

Introduction to RAID

Overview of RAID

Redundant array of independent drives (RAID) is an array of multiple independent hard drives that can be accessed simultaneously, improving I/O (input/output) performance. The RAID array is recognized by the host computer as a single storage unit or as multiple logical units. Data loss, because of a drive failure, can be prevented for RAID 1 and RAID 1+0 by reconstructing missing data from the remaining data drives.

RAID Terminology

IMPORTANT: Only RAID levels 0, 1, and 1+0 are supported by the Integrated ATA RAID Configuration Utility.

RAID 0 (Stripe)

RAID 0 is a RAID level that involves breaking up data into smaller blocks and then writing a block to each drive in the array (striping). RAID 0 does not provide any data redundancy, but does offer the best performance of any RAID level.

RAID 1 (Mirror)

RAID 1 is a RAID level that involves duplicating all data from one drive to a second drive (mirroring). RAID 1 provides complete data redundancy, but at the cost of doubling the required data storage capacity. You must have a minimum of two hard drives to support RAID 1.

RAID 1+0

RAID 1+0 (also known as RAID 10) is a RAID level that provides both striping and mirroring capabilities. RAID 1+0 mirrors data from one drive to another and then stripes the data across a second set of drives. You must have four hard drives to support RAID 1+0 on the server.

RAID 5

RAID 5 is not supported by the ProLiant ML310 server or the Integrated ATA RAID Configuration Utility. It is a RAID level that stripes data and parity information across drives and requires a minimum of three hard drives.

Spare

The spare option in the utility assigns an extra, unused drive as a spare to be used in case of a drive failure. The spare drive will not be used during normal system operation, and provides no additional storage capacity. A pre-configured spare hard drive will be brought into service only in the case of a RAID 1 failure.

IMPORTANT: The spare option is applicable only in RAID 1 for the server. If a spare is not available, the failed drive must be replaced with a new drive so that the data on the failed drive can be rebuilt. The replacement drive capacity must be greater than or equal to the failed drive it replaces.

Integrated ATA RAID Configuration Utility

The Integrated ATA RAID Configuration Utility is a standard feature of ATA models of the server. This section details the features of the utility, including how to access and change utility options.

Configuration Utility Features

The features of the Integrated ATA RAID Configuration Utility include the following:

- Optimized drive access
- RAID support before operating system loads
- Automatic detection and configuration (default is RAID 0)
- Support for PIO modes 0-4, MDMA modes 0-2, and Ultra DMA modes 0-5 (0-5 for ATA/100)
- Support for RAID levels 0, 1, and 1+0
- Multiple drive rebuilding
- Special handling of spare drive and rebuilding

Using the Configuration Utility

After all hard drives have been installed and connected, press the **F8** key during startup to run the Integrated ATA RAID Configuration Utility and view the setup screen.

IMPORTANT: If you do not run the configuration utility setup (**F8**), the option ROM will automatically configure the drives to individual RAID 0 arrays.

The setup screen has three menu windows:

- Array Information
- Physical Drive Information
- Help Information

Array Information

IMPORTANT: You cannot add drives or remove drives from an array that already has been configured, without destroying the data present on the already configured array.

The **Array Information** window of the setup screen displays all the drive arrays configured. Use this window to create, delete, or edit the existing configurations. Press the up arrow and down arrow keys to navigate the properties, and then press the **Enter** key to edit your selection. You can create additional arrays in this window. Refer to Chapter 2 of the *HP ProLiant ML310 Server Maintenance and Service Guide* for more information.

NOTE: To add additional arrays, follow the onscreen steps after an array configuration is selected. Refer to "Help Information" for more information about arrays.

Physical Drive Information

The **Physical Drive Information** window displays all the physical drives connected to the ATA/100 controller channels and their properties. Press the up arrow and down arrow keys to navigate this window. This window is not editable.

Help Information

IMPORTANT: When running the Configuration Utility, you may see RAID 0+1 displayed in place of RAID 1+0. RAID 0+1 and RAID 1+0 are used synonymously in this utility.

The **Help** window displays hints on available options and provides a list of keys that you can use to perform tasks, such as the following:

- **Switch Windows (Tab)**—switches the control back and forth between the **Array Information** and the **Physical Drive Information** windows.
- **Auto Configure RAID 0 (F1)**—automatically creates and configures a striped array based on the available physical drives installed.
- **Auto Configure RAID 1 (F2)**—automatically creates and configures a mirrored array based on the available physical drives installed. You must have a minimum of two free hard drives in the array.
- **Auto Configure RAID 1+0 (F3)**—automatically creates and configures a RAID 1+0 array based on the available physical drives installed. You must have four hard drives in the array.

IMPORTANT: All previous settings are lost when the **Auto Configure** option is run for RAID 0, RAID 1, and RAID 1+0 arrays.

- **Create Array (F4)**—creates a drive array. When this option is selected, a default array template is created. You must edit the array properties to complete the array creation. Use the arrow keys to select a property field, and then press the **Enter** key to edit that property. The array properties are as follows:
 - **Array Type**—selects the intended RAID mode including RAID 0, RAID 1, RAID 1+0, and Spare. The default for the **Array Type** option is RAID 0.
 - **Drive(s)**—selects the drives for the array. This option refers to the drive number listed in the **Physical Drives Information** box, not the number of drives in the array. Use the arrow keys, and then press the spacebar to select or deselect the drive or drives. Press the **Enter** key when done. There is no default for this setting.
 - **Stripe Size**—changes the stripe size. This field applies only to RAID 0 and RAID 1+0 arrays. The default stripe size is 64 KB.

IMPORTANT: RAID configurations do not support a stripe size less than 32 KB.

You cannot change the stripe size of an array that already has been configured.

- **Drive Size**—displays the size of the array and cannot be edited. If the array type is RAID 0, then the drive size is the total of all the drives selected. If the array type is RAID 1, drive size is shown by the smaller of the two drives making up the array.
- **Build Array**—is used to rebuild the array using a spare drive. When Build Array starts, it prompts the user to select the target drive, and then the rebuild starts. This option applies only to RAID 1 and RAID 1+0 arrays.
- **Initialize Array**—is used to clear the configuration information from drives attached to the Integrated ATA RAID controller.
- **Delete Array (F5)**—allows you to delete a currently configured array.
- **Restore Old Configuration (F6)**—restores the configuration that was there before you entered the utility.
- **Edit Options (F7)**—edits the physical drive option status boxes located in the top right corner of the **Physical Drive Information** window. The options are as follows:
 - **WC-OFF**—enables or disables write cache.



CAUTION: Enabling write cache may cause data loss or corruption during an unexpected loss of power.

- **DMA-ON**—enables or disables DMA (direct memory access) transfers, in which data is transferred directly from the memory to the hard drive without microprocessor intervention.

Pressing the **F7** key allows you to enable or disable these options. Press the **F7** key, move the cursor to the desired box, and then press the spacebar to check off the option. When enabled, the option status boxes change from red to green.

- **Save and Exit (F10)**—saves the configuration and exits the utility.

If you do not want to save the configuration or any changes that you have made, press the **Esc** key. Respond appropriately to the subsequent message boxes requiring confirmation.

Integrated ATA RAID Management Utility

The Integrated ATA RAID Management Utility is a standard feature of ATA models of the server. This section details the features of the utility, including how to access and change utility options.

Management Utility Features

The features of the Integrated ATA Management Utility include:

- Visual representation of array status using the **Applications** tray icon (Microsoft OS only)
- Writing of array status to log file (Linux, Netware, and Microsoft OS)
- Writing of array status to the console (Netware OS)
- Automatic rebuild of pre-configured online spares following a RAID 1 failure (Linux, Netware, and Microsoft OS)

Using the Management Utility

Once installed and running, no user intervention is required for the use of the Integrated ATA RAID Management Utility. The utility runs automatically at boot time.

If you must shut down the utility for any reason (such as updating to a newer version), follow OS-specific instructions in this section:

Microsoft Operating Systems

- Right-click on the **Spy** tray icon (a small, round character with sunglasses) and select **Quit Spy**. The Integrated ATA RAID Management Utility will quit.
- To restart the utility, perform one of the following actions:
 - Log out of and back into Windows to restart the utility.
 - Reboot the unit.
 - Manually start the application.

Novell Operating Systems

- From the console, type `Unload Spy`. The system should respond with a message that the module has been unloaded.
- To start the utility again, simply type `Load Spy`. Once again, the system should respond with a message verifying this operation.

Linux Operating Systems

- From a prompt, type `Spy-Stop`.
- To restart the utility, type `Spy-Start`.

Troubleshooting

- Inconsistent naming may occur between the Power-On Self Test (POST) and the Integrated ATA RAID Configuration Utility. Such is the case when a drive has failed in a RAID 1 or RAID 1+0 configuration. The POST message will list the array as running in a `Degraded` state and the Integrated ATA RAID Configuration Utility will list it as being in a `Rebuilding` state. If this inconsistency occurs, the array must be rebuilt.
- If you add drives to a configuration, the **Integrated ATA RAID Management Utility** tray icon (which is seen only under Microsoft operating systems) may indicate yellow or red, depending on the array condition. The color change indicates one of the following situations:
 - Errors are present on the array.
 - Error data from an earlier application of the drive is present, and is mistakenly being presented as new errors. Right-click on the tray icon and select **Erase Error Log** from the menu. If these are new errors, they will be rediscovered by the server.

Drive Connection Tips

- If you have two drives, connect one on each ATA/100 RAID channel. The performance of the array is enhanced when both channels are utilized.

- When attaching new drives to the array, be sure that any pre-existing configuration information has been cleared from the new drive. This may be accomplished by doing one of the following:
 - Running the SmartStart Erase Utility on the drive (running SmartStart with only the new drive connected)
 - Noting the position of the drive and editing any arrays (containing the newly added drive) presented in the Integrated ATA RAID Configuration Utility
- Use the same type of drives or drives with similar capability (in terms of speed and capacity).
- Do not use dissimilar drives on the same channel.
- Always use 80-conductor Ultra ATA cables.
- Be sure that proper jumper settings are used. Refer to Appendix E, “LED Indicators, Switches, and Jumpers,” for information.
- Do not connect any ATAPI devices (such as CD, ZIP, or LS120) to the ATA controller.

Configuration and Setup Tips

1. If you need to change array configuration, back up the data first. When an array configuration changes, previous data in that array is lost.

NOTE: If you do not select a RAID level for a newly added drive, then the drive will be configured as a stand-alone RAID 0.

2. If you get an unexpected message, such as `Drives Missing` or `Configuration Mismatch`, switch off the server and check all connections, ATA cables, and power cables.
3. If you get a `Configuration Mismatch` message after adding new drives, that is because the new drives had been used before and the configuration on the drives was not cleared. If this message is displayed, press the **F8** key to go to the setup and create the array configuration as needed.

Regulatory Compliance Notices

Regulatory Compliance Identification Numbers

For the purpose of regulatory compliance certifications and identification, your product has been assigned a unique series number. The series number can be found on the product nameplate label, along with all required approval markings and information. When requesting compliance information for this product, always refer to this series number. The series number should not be confused with the marketing name or model number of the product.

Federal Communications Commission Notice

Part 15 of the Federal Communications Commission (FCC) Rules and Regulations established Radio Frequency (RF) emission limits to provide an interference-free radio frequency spectrum. Many electronic devices, including computers, generate RF energy incidental to their intended function and are, therefore, covered by these rules. These rules place computers and related peripheral devices into two classes, A and B, depending upon their intended installation. Class A devices are those that may reasonably be expected to be installed in a business or commercial environment. Class B devices are those that may reasonably be expected to be installed in a residential environment (i.e., personal computers).

The FCC requires devices in both classes to bear a label indicating the interference potential of the device as well as additional operating instructions for the user. The rating label on the device shows the class (A or B) of the equipment. Class B devices have an FCC logo or FCC ID on the label. Class A devices do not have an FCC logo or FCC ID on the label. Once the class of the device is determined, refer to the following corresponding statement.

Class A Equipment

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at personal expense.

Class B Equipment

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

Reorient or relocate the receiving antenna.

- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio or television technician for help.

Declaration of Conformity for Products Marked with the FCC Logo – United States Only

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

For questions regarding the product, contact:

Hewlett-Packard Company
P. O. Box 692000, Mail Stop 530113
Houston, Texas 77269-2000

or call 1-800-652-6672. (For continuous quality improvement, calls may be recorded or monitored.)

For questions regarding this FCC declaration, contact:

Hewlett-Packard Company
P. O. Box 692000, Mail Stop 510101
Houston, Texas 77269-2000

or call 281-514-3333.

To identify this product, refer to the part, series, or model number found on the product.

Modifications

The FCC requires the user to be notified that any changes or modifications made to this device that are not expressly approved by Hewlett-Packard Company may void the user's authority to operate the equipment.

Cables

Connections to this device must be made with shielded cables with metallic RFI/EMI connector hoods in order to maintain compliance with FCC Rules and Regulations.

Canadian Notice (Avis Canadien)

Class A Equipment

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

Class B Equipment

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

European Union Notice



Products bearing the CE marking comply with the EMC Directive (89/336/EEC) and the Low Voltage Directive (73/23/EEC) issued by the Commission of the European Community and if this product has telecommunication functionality, the R&TTE Directive (1999/5/EC).

Compliance with these directives implies conformity to the following European Norms (in parentheses are the equivalent international standards and regulations):

- EN 55022 (CISPR 22) – Electromagnetic Interference
- EN55024 (IEC61000-4-2, 3, 4, 5, 6, 8, 11) – Electromagnetic Immunity
- EN61000-3-2 (IEC61000-3-2) – Power Line Harmonics
- EN61000-3-3 (IEC61000-3-3) – Power Line Flicker
- EN 60950 (IEC 60950) – Product Safety

Japanese Notice

ご使用になっている装置にVCCIマークが付いていましたら、次の説明文をお読み下さい。

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づくクラスB情報技術装置です。この装置は、家庭環境で使用することを目的としていますが、この装置がラジオやテレビジョン受信機に近接して使用されると、受信障害を引き起こすことがあります。

取扱説明書に従って正しい取り扱いをして下さい。

VCCIマークが付いていない場合には、次の点にご注意下さい。

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China Taiwan Notice

警告使用者：

這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策。

Laser Devices

All HP systems equipped with a laser device comply with safety standards, including International Electrotechnical Commission (IEC) 825. With specific regard to the laser, the equipment complies with laser product performance standards set by government agencies as a Class 1 laser product. The product does not emit hazardous light; the beam is totally enclosed during all modes of customer operation and maintenance.

Laser Safety Warnings



WARNING: To reduce the risk of exposure to hazardous radiation:

- Do not try to open the laser device enclosure. There are no user-serviceable components inside.
 - Do not operate controls, make adjustments, or perform procedures to the laser device other than those specified herein.
 - Allow only authorized service technicians to repair the laser device.
-

Compliance with CDRH Regulations

The Center for Devices and Radiological Health (CDRH) of the U.S. Food and Drug Administration implemented regulations for laser products on August 2, 1976. These regulations apply to laser products manufactured from August 1, 1976. Compliance is mandatory for products marketed in the United States.

Compliance with International Regulations

All systems equipped with laser devices comply with appropriate safety standards including IEC 825.

Laser Product Label

The following label or equivalent is located on the surface of the HP supplied laser device.



This label indicates that the product is classified as a CLASS 1 LASER PRODUCT. This label appears on a laser device installed in the product.

Laser Information

Laser Type	Semiconductor GaAlAs
Wave Length	780 nm +/- 35 nm
Divergence Angle	53.5 degrees +/- 0.5 degrees
Output Power	Less than 0.2 mW or 10,869 W·m-2 sr-1
Polarization	Circular 0.25
Numerical Aperture	0.45 inches +/- 0.04 inches

Battery Replacement Notice

The computer is provided with an internal lithium battery or battery pack. There is a danger of explosion and risk of personal injury if the battery is incorrectly replaced or spare designated for this product.

For more information about battery replacement or proper disposal, contact your authorized reseller or your authorized service provider.



WARNING: The computer contains an internal lithium manganese dioxide, or a vanadium pentoxide, or an alkaline battery pack. There is risk of fire and burns if the battery pack is not handled properly. To reduce the risk of personal injury:

- Do not attempt to recharge the battery.
 - Do not expose to temperatures higher than 60°C (140°F).
 - Do not disassemble, crush, puncture, short external contacts, or dispose of in fire or water.
 - Replace only with the spare parts designated for this product.
-



Batteries, battery packs, and accumulators should not be disposed of together with the general household waste. To forward them to recycling or proper disposal, please use public collection system or return them to HP or to authorized resellers.

Power Cords

The power cord set included in the server meets the requirements for use in the country where you purchased the server. If you need use this server in another country, you should purchase a power cord that is approved for use in that country.

The power cord must be rated for the product and for the voltage and current marked on the product's electrical ratings label. The voltage and current rating of the cord should be greater than the voltage and current rating marked on the product. In addition, the diameter of the wire must be a minimum of 1.00 mm² or 18AWG, and the length of the cord must be between 1.8 m (6 feet) and 3.6 m (12 feet). If you have questions about the type of power cord to use, contact your authorized service provider.

IMPORTANT: Route power cords so that they will not be walked on or pinched by items placed upon or against them. Pay particular attention to the plug, electrical outlet, and the point where the cords exit from the product.

Mouse Compliance Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Electrostatic Discharge

To prevent damaging the system, be aware of the precautions you must follow when setting up the system or handling parts. A discharge of static electricity from a finger or other conductor may damage system boards or other static-sensitive devices. This type of damage may reduce the life expectancy of the device.

Preventing Electrostatic Discharge

To prevent electrostatic damage, observe the following precautions:

- Avoid hand contact by transporting and storing products in static-safe containers.
- Keep electrostatic-sensitive parts in their containers until they arrive at static-free workstations.
- Place parts on a grounded surface before removing them from their containers.
- Avoid touching pins, leads, or circuitry.
- Always be properly grounded when touching a static-sensitive component or assembly.

Grounding Methods

There are several methods for grounding. Use one or more of the following methods when handling or installing electrostatic-sensitive parts:

- Use a wrist strap connected by a ground cord to a grounded workstation or computer chassis. Wrist straps are flexible straps with a minimum of 1 megohm \pm 10 percent resistance in the ground cords. To provide proper grounding, wear the strap snug against the skin.
- Use heel straps, toe straps, or boot straps at standing workstations. Wear the straps on both feet when standing on conductive floors or dissipating floor mats.
- Use conductive field service tools.
- Use a portable field service kit with a folding static-dissipating work mat.

If you do not have any of the suggested equipment for proper grounding, have a authorized reseller install the part.

NOTE: For more information on static electricity, or assistance with product installation, contact your authorized reseller.

Server Error Messages

For a complete listing of error messages, refer to the *Servers Troubleshooting Guide*, also included in the ProLiant Essentials Foundation Pack.

D

Troubleshooting

This appendix provides specific troubleshooting information for the ProLiant ML310 server. Use it to diagnose server startup and installation problems.

For information on LEDs, switch settings, and jumpers, refer to Appendix E, “LED Indicators, Switches, and Jumpers.”

For information about general troubleshooting techniques, diagnostic tools, preventative maintenance, and a complete list of error messages, refer to the *Servers Troubleshooting Guide*, also included in the ProLiant Essentials Foundation Pack.

This appendix includes the following topics:

- **When the Server Does Not Start**—You are provided with step-by-step instructions on what to try and where to go for help with the most common problems encountered during initial Power-On Self-Test (POST). A successful startup requires the server to complete this test each time you power up, before the server can load the operating system and start running software applications.
- **Problems After Initial Startup**—After the server has passed POST, you may still encounter errors, such as an inability to load the operating system. You are provided with instructions on what to try and where to go for help when you encounter errors after the server completes POST.
- **Other Information Resources**—This section provides a list of references for troubleshooting beyond the scope of this guide.

When the Server Does Not Start

This section provides step-by-step instructions when encountering the most common problems during the initial Power-On Self-Test (POST). Every time the server boots, it must complete POST before it can load the operating system and start running software applications.

If the server completes POST and attempts to load the operating system, go to “Problems After Initial Startup” in this appendix.



WARNING: There is a risk of personal injury from hazardous energy levels. The installation of options and the routine maintenance and service of this product must be performed by individuals who are knowledgeable about the procedures, precautions, and hazards associated with equipment containing hazardous energy circuits.

When the server does not start:

1. Be sure that the server and monitor are plugged into a working outlet.
2. Be sure that the power source is working properly:
 - Check the status using the Power On/Standby LED.
Refer to “Server LEDs” in Appendix E for the location and status of the Power On/Standby LED.
 - Be sure that the Power On/Standby switch was pressed firmly.
Refer to the *Servers Troubleshooting Guide* for details on what else to check.
3. If the server does not complete POST, or it does complete POST but does not load the operating system, refer to the *Servers Troubleshooting Guide*.

NOTE: If the server is rebooting repeatedly, be sure that the server is not restarting due to an Automatic Server Recovery (ASR) power-up caused by another problem. Check Insight Manager for notification of this event. Refer to the *Servers Troubleshooting Guide* for more information.

4. Restart the server.
5. Check for the following normal power-up sequence to be sure that the server meets the minimal hardware requirements and is powered up under normal operation:
 - a. The front panel Power On/Standby LED turns green.
 - b. The fans start up.
 - c. The monitor displays messages regarding server initialization in the following sequence:

Video initialization—The initialization screen is displayed.

Processor initialization

Memory test

Memory initialization

Diskette drive

SCSI devices (if applicable)

ATA devices (if applicable)

Option ROM
 - d. The operating system loads to complete the boot process.

If the problem persists, continue with the section, “Diagnosis Steps,” in this appendix.

Diagnosis Steps

If the server does not power up, or powers up but does not complete POST, answer the questions in Table D-1 to determine appropriate actions based on the symptoms observed. According to the answers you give, you will be directed to the appropriate table, which outlines possible reasons for the problem, options available to assist in diagnosis, possible solutions, and references to other sources of information.

Table D-1: Diagnosis Steps

Question	The Next Step
Question 1: Is the front panel Power-On/Standby LED on? (either solid green or flashing)	<p>If no, go to Table D-2, and then continue to Question 2 if the problem is not solved.</p> <p>If yes, continue to Question 3.</p>
<p>Question 2: Are any system board LEDs showing a failure or error condition?</p> <p>Refer to Appendix E, "LED Indicators, Switches, and Jumpers," for the location and status information of all system board LEDs.</p>	<p>If no, go to Question 3.</p> <p>If yes, then:</p> <ol style="list-style-type: none"> 1. Reseat the applicable component, and then restart the server. 2. If reseating does not fix the problem, replace the component with a known working component, and then restart the server. 3. Contact your authorized service technician if steps 1 and 2 do not fix the problem.

continued

Table D-1: Diagnosis Steps *continued*

Question	The Next Step
Question 3: Can you see anything on the monitor?	<p>If no, go to Table D-3.</p> <p>If yes, video is available for diagnosis. Determine the next action by observing POST progress and error messages. Refer to the <i>Servers Troubleshooting Guide</i> for a complete description of each POST error message.</p>
<p>Note: If the server attempts to load the operating system, go to “Problems After Initial Startup” in this appendix.</p>	

Table D-2: Front Panel Power-On/Standby LED Is Not On



WARNING: To reduce the risk of electric shock or damage to the equipment, before opening access panels to reseat components, power down the server, and then disconnect the power cord.

Note: For LED locations and functions, refer to Appendix E, “LED Indicators, Switches, and Jumpers.”

Possible Reasons	The Next Step
There is no AC power connection.	1. Check the power cables. Be sure that they are fully connected.
The power button was not firmly pressed.	2. Press the power button.
The power button connector cable is not properly connected to the system board.	3. Check the power source. Refer to the <i>Servers Troubleshooting Guide</i> for further options.
A processor has failed or is not properly seated.	4. Reconnect the power button cable to the system board. Refer to Chapter 1, “Server Features,” for the location of the power button connector.
The power supply has failed or is not connected.	5. Power down the server. Reseat all expansion boards, DIMMs, processors, and PPMs, checking that all cables are securely connected. Refer to Chapter 3, “Hardware Options Installation,” for complete instructions. Refer to the <i>Servers Troubleshooting Guide</i> for tips on proper procedures.
	6. Check the diagnostic LEDs on the system board for failure conditions.
	7. If these steps do not correct the problem, the most likely cause lies either in the power supply subsystem or a processor. Contact your authorized service provider for further technical support.
	Refer to the <i>Servers Troubleshooting Guide</i> for a list of authorized service providers.

Table D-3: Server Does Not Have Video



WARNING: To reduce the risk of electric shock or damage to the equipment, before opening access panels to reseal components, power down the server, and then disconnect the power cord.

Note: For LED locations and functions, as well as switch setting information, refer to Appendix E, “LED Indicators, Switches, and Jumpers.”

Possible Reasons	The Next Step
Video may not be properly connected.	1. Be sure that the monitor has power and that the monitor cable is securely connected. If more than one video adapter is installed, be sure that the monitor is connected to the correct video board.
Switches may not be correctly set on the system board.	2. Be sure that the monitor is functional by connecting it to a known working server.
If an optional video board was installed, the monitor cable may not be correctly connected.	3. Be sure that the switch settings on the system board are correctly set.
The monitor may be connected to the wrong video connector.	4. Power down the server. Reseat all expansion boards and DIMMs, and then check all cable connections.
Expansion boards or DIMMs may not be properly connected or seated.	Refer to Chapter 3, “Hardware Options Installation,” for bezel and side panel removal.
	5. Restart the server.
	6. Listen for audible indicators, such as a series of beeps. A series of beeps indicates the presence of a POST error message.
	Refer to the <i>Servers Troubleshooting Guide</i> for a complete listing of possible POST error messages.
	7. Check the diagnostic LEDs on the system board for failure conditions.
	8. Refer to the <i>Servers Troubleshooting Guide</i> for more information on video problems.
	If these steps do not correct the problem, contact your authorized service provider for further technical support.

Problems After Initial Startup

After the server has passed POST, you may still encounter errors, such as an inability to load the operating system. Use Table D-4 to troubleshoot server installation problems that occur after the initial startup.

For updated information on supported operating systems, refer to Appendix F, “Specifications,” or refer to

www.compaq.com/products/servers/platforms/

NOTE: If the server is rebooting repeatedly, be sure that the server is not restarting due to an Automatic Server Recovery (ASR) power-up caused by another problem. Check Insight Manager for notification of this event. Refer to the *Servers Troubleshooting Guide* for more information.

Refer to the *Servers Troubleshooting Guide* for the following:


- Information you must collect when diagnosing software problems and to provide when contacting support
- Instructions on how to upgrade the operating system and its drivers
- Information on available recovery options and advice on minimizing downtime

Table D-4: Problems After Initial Startup

Problem	Possible Cause	Possible Solution
The server cannot load SmartStart.	The wrong version of SmartStart is being installed.	<ol style="list-style-type: none"> 1. Check the SmartStart release notes and user documentation. 2. Refer to the HP website to check the version of SmartStart.
	The CD-ROM/diskette drive assembly is not set as a bootable device.	<ol style="list-style-type: none"> 1. Press the F9 key to run the ROM-Based Setup Utility (RBSU). 2. Set defaults and exit the utility. 3. Rerun RBSU to check the system configuration. <p>Refer to Chapter 5, "Server Configuration and Utilities," or refer to the <i>HP ROM-Based Setup Utility User Guide</i>, for complete instructions on the use of RBSU.</p>
	The CD-ROM/diskette drive assembly is either not installed, or is not properly connected.	<ol style="list-style-type: none"> 1. Power down the server. 2. Be sure that the CD-ROM/diskette drive assembly is installed. 3. Remove and reseal the CD-ROM/diskette drive assembly. 4. Check the cable between the backplane and the CD-ROM/diskette drive assembly to ensure proper connection. <p>Refer to the <i>HP ProLiant ML310 Server Maintenance and Service Guide</i> for connection information.</p> <p>If the cable is not the problem, refer to the <i>Servers Troubleshooting Guide</i> for other options.</p>
	The diskette in the CD-ROM/diskette drive assembly is preventing the system from loading.	Remove the diskette.
SmartStart fails during installation.	An operating system has not been selected.	<ol style="list-style-type: none"> 1. Press the F9 key to run RBSU. 2. Select the primary operating system.

continued

Table D-4: Problems After Initial Startup *continued*

Problem	Possible Cause	Possible Solution
	Error occurs during installation.	Follow the error information provided. If it is necessary to reinstall, first run the System Erase Utility. Refer to the <i>Servers Troubleshooting Guide</i> .
	CAUTION: The System Erase Utility causes the loss of all configuration information, as well as loss of existing data on all connected hard drives. Before performing this operation, refer to the <i>Servers Troubleshooting Guide</i> and read about the System Erase Utility and the associated cautionary statements.	
Server cannot load the operating system.	The required operating system step was missed.	<ol style="list-style-type: none"> 1. Note at which phase the operating system failed. 2. Remove any loaded operating system components. 3. Refer to the operating system documentation. 4. Reinitiate installation procedures.
	An installation problem occurred.	Refer to the operating system documentation and to the SmartStart release notes.
	The primary hard drive controller installation is incorrect.	Run RBSU by pressing the F9 key and correct this problem.
	The hard drive controller order is incorrect.	Run RBSU by pressing the F9 key and correct this problem.
	A problem was encountered problem after new hardware was added to the server.	Refer to the documentation provided with the hardware. Remove the new hardware.
	A problem was encountered with the hardware added to a server with a factory-installed operating system.	<p>You must complete the factory-installed operating system software installation before adding new hardware to the server.</p> <p>Be sure that you are following the instructions provided in the <i>HP Factory-Installed Operating System Software Installation Guide</i>.</p> <p>Remove the new hardware and complete the software installation. Then, reinstall the new hardware.</p>
Note: Refer to Chapter 5, "Server Configuration and Utilities," or refer to the <i>HP ROM-Based Setup Utility User Guide</i> , for complete instructions on the use of RBSU.		

Other Information Resources

Refer to the following information in Table D-5 for additional help.

Table D-5: ProLiant ML310 Server Troubleshooting Resources

Resource	What it is
<i>Servers Troubleshooting Guide</i>	This is a resource for obtaining troubleshooting information that is beyond the scope of this document. It includes general hardware and software troubleshooting information for all ProLiant servers, a complete list of error messages along with an explanation of probable cause, and a list of appropriate measures. This guide ships with the server.
<i>HP ProLiant ML310 Server Maintenance and Service Guide</i>	<p>This resource provides a complete list of all replacement parts available, along with step-by-step instructions on installation and replacement. Find this guide on the following website:</p> <p>www.compaq.com/support</p> <p>Follow the link for maintenance and service guides, and download the guide provided for the server.</p>

You can access information on warranties and service and support upgrades (CarePac services) by visiting the following website:

www.compaq.com/services/carepac

LED Indicators, Switches, and Jumpers

This appendix provides information on LED statuses, switch settings, and jumper settings for ProLiant ML310 servers.

This appendix includes the following topics:

- **LEDs** There are several LEDs located on the front, the back, and the inside of the server. These LEDs communicate the status of the server components and operations, thus aiding you in diagnosing the problem. This appendix provides you with an illustration of the location of each LED on the server, as well as an explanation of uses and possible statuses.
- **Switches** There are two switchbanks in the server. Some switch settings may need to be changed from time to time and can cause problems if they are not correctly set. Some switches should not be changed for any reason. This appendix provides you with a description of what each setting means, and an illustration of where the switches are found inside the server.
- **Jumpers** When devices are added to the server, the jumpers on the device may need to be changed. This appendix provides you with information on jumper settings for both SCSI and ATA devices.

For information beyond the scope of this guide, both general and specific to the server, refer to “Other Information Resources” in Appendix D.

LEDs

A variety of LEDs are located on the front and back of the server. These LEDs aid you in diagnosing problems by communicating the status of the components and operations of the server. The following LEDs specific to the server are explained in this appendix:

- Server LEDs (on the front of the server)
- System board LEDs
- Network controller LEDs (on the back of the server)

Server LEDs

The server LEDs and the power button are located on the front of the server.

The server LEDs show the following:

- Power On/Standby status
- Hard drive activity
- Health status
- NIC link/activity status

The power button allows you to:

- Power up the server (provide AC power)
- Place the server in standby mode
- Power down the server

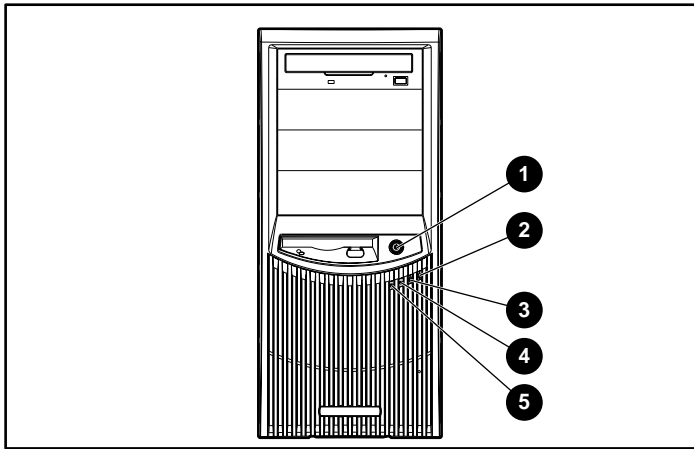


Figure E-1: Power button and server LEDs

Table E-1: Power Button and Server LEDs

Item	Description	Status	Means
1	Power button	N/A	N/A
2	Power On/Standby LED	Green flashing	Server is in standby mode. Do not remove power from the server.
		Green	Server on, AC power OK. Do not remove power from server.
		Amber	AC power OK. Server ready to be turned on. It is safe to disconnect AC power from server.
		Off	Server off, no AC power.
3	Hard drive LED	On or flashing	A hard drive is being accessed.
		Off	No hard drive is currently being accessed.

continued

Table E-1: Power Button and Server LEDs *continued*

Item	Description	Status	Means
4	NIC Link/Activity	Green	Link established.
		Flashing	Network currently active.
		Off	Not linked to network.
5	Internal health LED	Green	Server powered on and server health is good.
		Off	Server off or AC power is not connected.
		Amber	System health degraded, pre-failure warning.
		Red	System health critical, attention needed.

System Board LEDs

The LEDs identified in Figure E-2 and Table E-2 are located on the system board of the server and indicate error conditions, such as processor, PPM, or memory module failures.

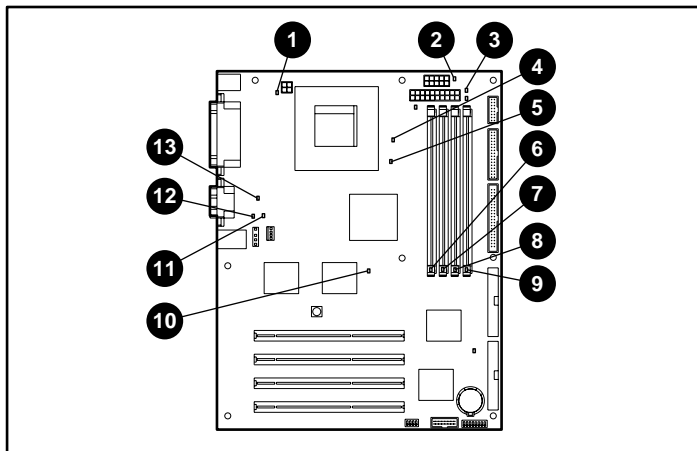
**Figure E-2: System Board LEDs**

Table E-2: System Board LEDs

Item	Description	Status
1	Processor power connector not installed	Off = Installed. Amber = Power connector not installed.
2	Second power connector not installed	Off = Installed. Amber = Power connector not installed.
3	AC power	Off = The AC power cord is not plugged into the power supply, the power supply connector is not attached to the system board, or the power supply failed. Green = Power supply is attached to AC power.
4	CPU 1 failure or failure	Off = CPU 1 is functioning. Amber = CPU 1 failed or is missing.
5	Processor thermal failure	Off = Processor temperature is normal. Amber = Thermal trip for processor 1 detected. Refer to POST error messages for appropriate instructions.
6	DIMM 4 pre-failure/failure	Off = DIMM 4 is functioning. Amber = DIMM 4 failed.
7	DIMM 3 pre-failure/failure	Off = DIMM 3 is functioning. Amber = DIMM 3 failed.
8	DIMM 2 pre-failure/failure	Off = DIMM 2 is functioning. Amber = DIMM 2 failed.
9	DIMM 1 pre-failure/failure	Off = DIMM 1 is functioning. Amber = DIMM 1 failed.

continued

Table E-2: System Board LEDs *continued*

Item	Description	Status
10	System thermal failure	Off = Temperature is normal. Amber = Temperature threshold exceeded.
11	CPU fan failure	Off = Fan is functioning. Amber = Fan is not installed or has failed.
12	System fan failure	Off = Fan is functioning. Amber = Fan is not installed or has failed.
13	Integrated processor power module (PPM) failure	Off = PPM is functioning. Amber = PPM failed.

Network Controller LEDs

The network controller LEDs are located on the back of the server. They provide the following information:

- If the server is linked to the network
- If there is current network activity

Refer to the *Servers Troubleshooting Guide* for more information on troubleshooting network controller problems.

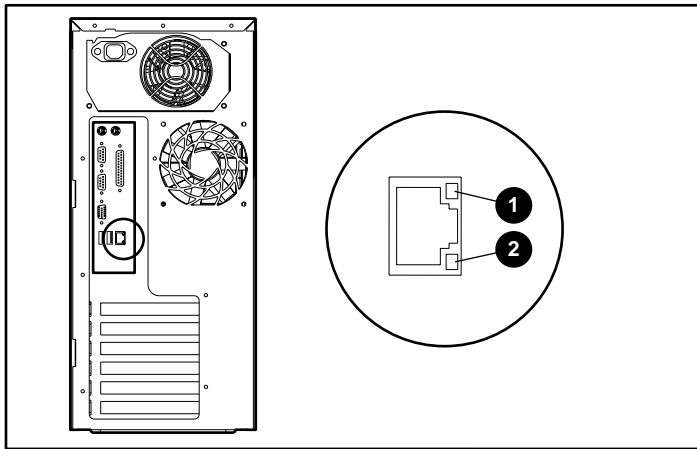


Figure E-3: Network controller LEDs

Table E-3: Network Controller LEDs

Item	Description	Status	Means
1	Network activity LED	Off	No network activity
		Flashing	Network activity
2	Network link LED	Off	No network link
		On	Linked to network

Switch Settings

The server contains two switchbanks. This section explains the use of each reserved and nonreserved switch.

System Configuration Switch Settings

The system configuration switchbank is located on the system board. Some switches are reserved for use by authorized service providers and must not be changed unless instructed otherwise.

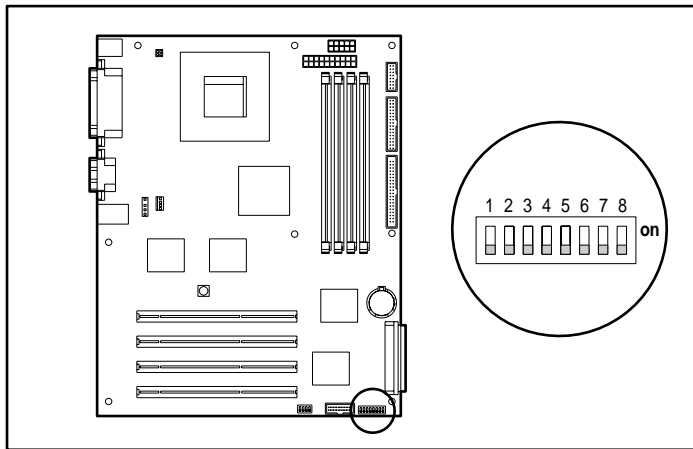


Figure E-4: System configuration switch default settings

Table E-4: System Configuration Switch Settings

CAUTION: Clearing nonvolatile RAM (NVRAM) deletes the system configuration. Refer to Chapter 5, "Server Configuration and Utilities," for instructions on configuring the server.

Position	Default	Description	Settings
1	Off	Reserved	N/A
2	Off	Lock configuration	Off = Normal operation On = Configuration changes cannot be made
3	Off	Tower/rack configuration	Off = Tower configuration On = Rack configuration
4	Off	Diskette boot	Off = Observe RBSU diskette boot selection On = Override RBSU diskette boot selection and allow boot to diskette
5	Off	Password override	Off = Normal On = Override password prompts
6	Off	Clear CMOS and NVRAM	Off = Normal On = When the server is powered up, all system configuration information is erased
7	Off	Reserved	N/A
8	Off	Reserved	N/A

Note: Switch positions 1, 7, and 8 are reserved for authorized service providers only. Do not change the specified default setting for these positions, unless instructed otherwise.

Resetting System Configuration Settings

It may be necessary at some time to clear and reset system configuration settings. When the system configuration switch position 6 is set to the **On** position, the server is prepared to erase all system configuration settings from both CMOS and NVRAM.



CAUTION: Clearing nonvolatile RAM (NVRAM) deletes the system configuration. Refer to Chapter 5, “Server Configuration and Utilities,” for instructions on configuring the server.

To reset system configuration settings:

1. Power down the server.
2. Set the system configuration switch position 6 to the **On** position.
3. Power up the server.

All configuration settings are now erased and all server operations halt.

4. Power down the server, when prompted during POST.
5. Reset the position 6 switch to the default **Off** position.
6. Power up the server.
7. Reset all system configuration settings by pressing the **F9** key (or the **F8** key if you are using an ATA model) to run the ROM-Based Setup Utility (RBSU).

Refer to Chapter 5, “Server Configuration and Utilities,” or the *HP ROM-Based Setup Utility User Guide*, for more information on RBSU.

Redundant ROM Settings

IMPORTANT: Switching ROM images can also be done through RBSU. Use the following procedures when RBSU is inaccessible. For information on accessing redundant ROM options through RBSU, as well as disaster recovery procedures, refer to Chapter 5, “Server Configuration and Utilities.”

To switch from the current ROM to the backup ROM:

1. Power down the server.
2. Set the system configuration switch positions 1, 5, and 6 to the **On** position.
3. Power up the server. The ROM will beep and halt when the ROM images have been swapped.
4. Power down the server and reset all system configuration switch positions to the default **Off** position.
5. Power up the server.

If both the current and previous versions of the ROM are corrupted, refer to “Automatic Server Recovery” in Chapter 5.

System ID Switch Settings

The system ID switchbank, located on the system board, is reserved for use by authorized service providers only. Do not change the indicated default settings.

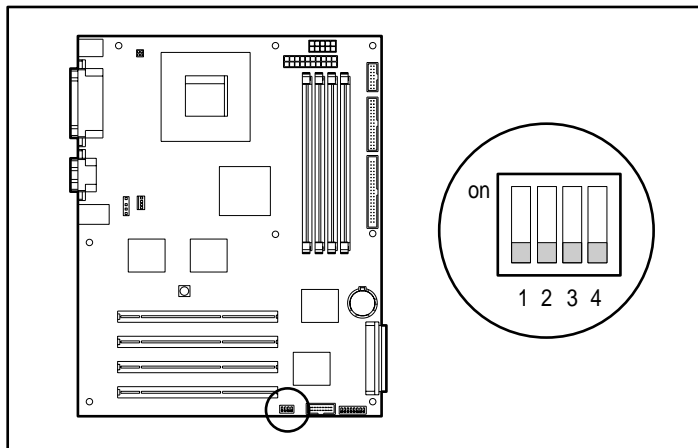


Figure E-5: System ID Switch

Table E-5: System ID Switch Settings

Position	Default	Function
1	Off	Reserved
2	Off	Reserved
3	Off	Reserved
4	Off	Reserved

Jumper Settings

SCSI Device Jumper Settings

No two SCSI devices connected to the same SCSI controller can have the same SCSI ID. If another SCSI device is connected to the controller, check its SCSI ID before beginning the installation procedure for the additional device. The SCSI ID is set by jumpers located on each device. For more information, refer to the SCSI device option documentation.

ATA Device Jumper Settings

When installing any ATA devices, be sure that the jumper on the device is set to Cable Select (CS). This setting allows the cable to automatically assign the device ID of an ATA drive attached to the cable. For information on cabling ATA devices, refer to Chapter 4, “Cabling Guidelines.”

Specifications

This chapter provides detailed information for the operation of the ProLiant ML310 server, including the following:

- Server specifications
 - Dimensions
 - Power requirements
 - Temperature requirements
- Minimum hardware configuration
- Supported operating systems
- Drivers

Server Specifications

Table F-1: ProLiant ML310 Server Specifications

Dimensions		
Height	42.0 cm (16.5 in)	
Depth	48.5 cm (19.1 in)	
Width	19.1 cm (7.5 in)	
Approximate weight	18.18 kg (40 lb), depending on options	
Input specifications (per power supply)	U.S.	International
Rated input voltage	100 VAC to 120 VAC	200 VAC to 240 VAC
Rated input frequency	50 Hz to 60 Hz	50 Hz to 60 Hz
Rated input current	6 A	3 A
Input power (Btu/hr)	1,560 Btu/hr	1,560 Btu/hr
Output specifications (per power supply)		
Rated steady-state power	300 W	
Maximum peak power	400 W	
Temperature range (see Note)		
Operating	50°F to 95°F	10°C to 35°C
Shipping	-40°F to 158°F	-40°C to 70°C
Maximum wet bulb temperature	82.4°F	28°C
Relative humidity (noncondensing)		
Operating	10% to 90%	10% to 90%
Nonoperating	5% to 95%	5% to 95%
Note: All temperature ratings shown are for sea level. There is an altitude derating of 1°C per 300 m to 3,000 m (1.8°F per 1,000 ft to 10,000 ft).		

Minimum Hardware Configuration

Be sure that the server meets the requirements for minimum hardware configuration. During the troubleshooting process, it may be necessary to reduce the server to its minimum configuration, reinstalling options one at a time to determine the cause of failure.

Table F-2: Minimum Hardware Configuration

Component	Minimum Specifications
Processors	A processor must be installed in processor socket 1.
Fans	A system fan and CPU heatsink fan should be installed and connected to the system board.
Memory	At least one slot must be populated with a 128-MB 200/266-MHz ECC Registered PC2100 DDR SDRAM DIMM.
Note: The maximum memory configuration is 4 x 1-GB memory modules.	

Also refer to the *HP ProLiant ML310 Server Maintenance and Service Guide* at www.compaq.com/support

Supported Operating Systems

To operate properly, the server must have a supported operating system. For updated information on supported operating systems, refer to

www.compaq.com/products/servers/platforms/

For the latest information on the Linux operating system version and support, refer to

www.compaq.com/products/servers/linux/certMatrix.html



CAUTION: If the server has a factory-installed operating system, configure the server using the instructions in the *HP Factory-Installed Operating System Software Installation Guide* or data will be lost.

Drivers

The server features new hardware that does not have driver support on all operating system installation media. It is recommended that you use SmartStart and its Assisted Path feature to install the operating system and the latest driver support. If you do not use SmartStart to install the operating system, drivers for some of the new hardware are required. These drivers, as well as other option drivers, ROM images, and value-add software can be downloaded from

www.compaq.com/support/files/server

For more information on drivers, refer to the *Servers Troubleshooting Guide*.

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